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circulation

CITY OF MOUNTAIN VIEW · CALIFORNIA

About the Cover:

The cover design attempts to show the essence of planning which is to achieve a harmonious and efficient co-ordination of planning's three basic elements -- land use, public facilities and circulation. The tree signifies a park, the public facilities element of planning; the urban symbol in the horizon signifies land use; and, the street serving these two elements signifies the third element, circulation.

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CITY OF MOUNTAIN VIEW

MOUNTAIN VIEW, CALIFORNIA
94042

Department Planning

July 9, 1965

Honorable Mayor and Members
of the City Council
Chairman and Members of the
Planning Commission
City Hall
Mountain View, California

Gentlemen:

This traffic circulation study is submitted as the final element in the background studies for the comprehensive revision of the General Plan. This planning study sets forth vehicular traffic expectations for the time period to 1985. This document is not to be confused with the traffic element of the General Plan but is to be taken as a background study for the development of the arterial street system in the General Plan. It is based upon land use assumptions made in the early stages of the plan development and is subject to modification in accordance with modified land use policies. Furthermore, this study extends traffic to 1985, the General Plan goes well beyond this time. It may be, too, that the community will wish to sacrifice convenient movement of automobiles in cases where this would conflict with such other community values. The City's decisions in these matters should appear in the General Plan.

This report should be the subject of discussion and review and a meeting has been established with our consultants to be held in City Hall on July 19, 1965.

Yours truly,

Robert S. Lawrence

Robert S. Lawrence
Director of Planning

RSL:ahr

540 CASTRO STREET · PHONE 967-7211

Wilbur Smith & Associates, Inc.
CALIFORNIA

CONSULTING ENGINEERS

580 MARKET STREET
SAN FRANCISCO, CALIF. 94104
YUKON 2-3221

May 24, 1965

Mr. Robert S. Lawrence
Director of Planning
City of Mountain View
City Hall
Mountain View, California 94042

Dear Sir:

We are pleased to submit our report of the Mountain View Traffic Circulation Study, in accordance with our agreement of August 17, 1964.

Presented in this report are recommended 1985 major street needs. These needs are based on traffic projections commensurate with the land use projections developed by the Planning Department of Mountain View. Also included is consideration of mass transportation with respect to its possible application in Mountain View.

We are grateful for the opportunity to assist in the development of the traffic circulation element for your 1985 General Plan, and wish to thank you, your colleagues, and outside agencies for the assistance provided us throughout our project.

Very truly yours,

Henry K. Evans

Henry K. Evans, Vice President

Registered Professional Engineer
California No. 7534

HKE:gb

CITY COUNCIL

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Dirk vanErp

*Served as Chairman
during the preparation
of this study -
Resigned - June 30, 1965

TRAFFIC CIRCULATION STUDY

MOUNTAIN VIEW, CALIFORNIA

Prepared For

The City of Mountain View
For the General Plan Circulation Element

May 1965

The preparation of this report was financed in part through an urban planning grant from the Housing and Home Finance Agency, under the provisions of Section 701 of the Housing Act of 1954, as amended.

Wilbur Smith & Associates
580 Market Street
San Francisco, Calif.
94104

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Chapter I
INTRODUCTION

The City of Mountain View, California, is located in the northwestern part of Santa Clara County adjoining the cities of Sunnyvale on the east, Los Altos on the south, and Palo Alto on the west. At the turn of the century, the Mountain View area was occupied principally by extensive fruit orchards, row crops, and associated food processing plants. Following World War II, a departure from the agricultural economy of the area has been taking place, with production of "space age" hardware and other activities connected with the space and missile industries assuming an ever increasing role. Paralleling this change has been a tremendous increase in residential development.

The future growth of Mountain View as a research, manufacturing, and residential center will depend to a considerable degree upon its attractiveness both to residents and visitors with respect to its traffic accessibility and the adequacy of its street system. This report deals with the growing problem of traffic circulation and a major street plan capable of serving traffic within the City of Mountain View in 1985.

Growth Trends

As late as 1950, Mountain View had a resident population of less than 7,000. By 1960, it had increased to 30,889. The overall population of the Mountain View planning area at that same time was estimated to be 37,200.[1] Projection of the planning area population indicates a doubling

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[1] See companion report, Economic Analysis, Larry Smith & Co., August, 1964.

within the next 20 years. Local, county, and state population data are compared in Table 1 and Figure 1. Following the rapid increase during the 1950s, the population of Mountain View is estimated to increase in proportion with the population of Santa Clara County.

The use of private automobiles in this area has grown rapidly, with the rate of increase exceeding that of the population growth, as shown in Table 2 and Figure 2.

Purpose and Scope

This report has been prepared as one of the basic studies to be used in the preparation for the comprehensive revision of the General Plan for the City of Mountain View. The City Council, in cooperation with the State of California Office of Planning, engaged the firm of Wilbur Smith and Associates to make recommendations concerning the traffic circulation element for this revision.

Traffic and land use are interdependent; proposed or final policy decisions with respect to land use may dictate adjustments or major changes in the street and highway facilities included in this report. Actual, as opposed to estimated population or development growth rates, may also cause adjustments in the traffic projections, and, hence, in the street and highway needs. The street and highway needs herein are indicated for 1985, while the General Plan is understood to be staged not only to 1985, but to a land use saturation date beyond 1985.

Factors upon which the street and highway plan are based include current and future data concerning the following:

Table 1

POPULATION TRENDS

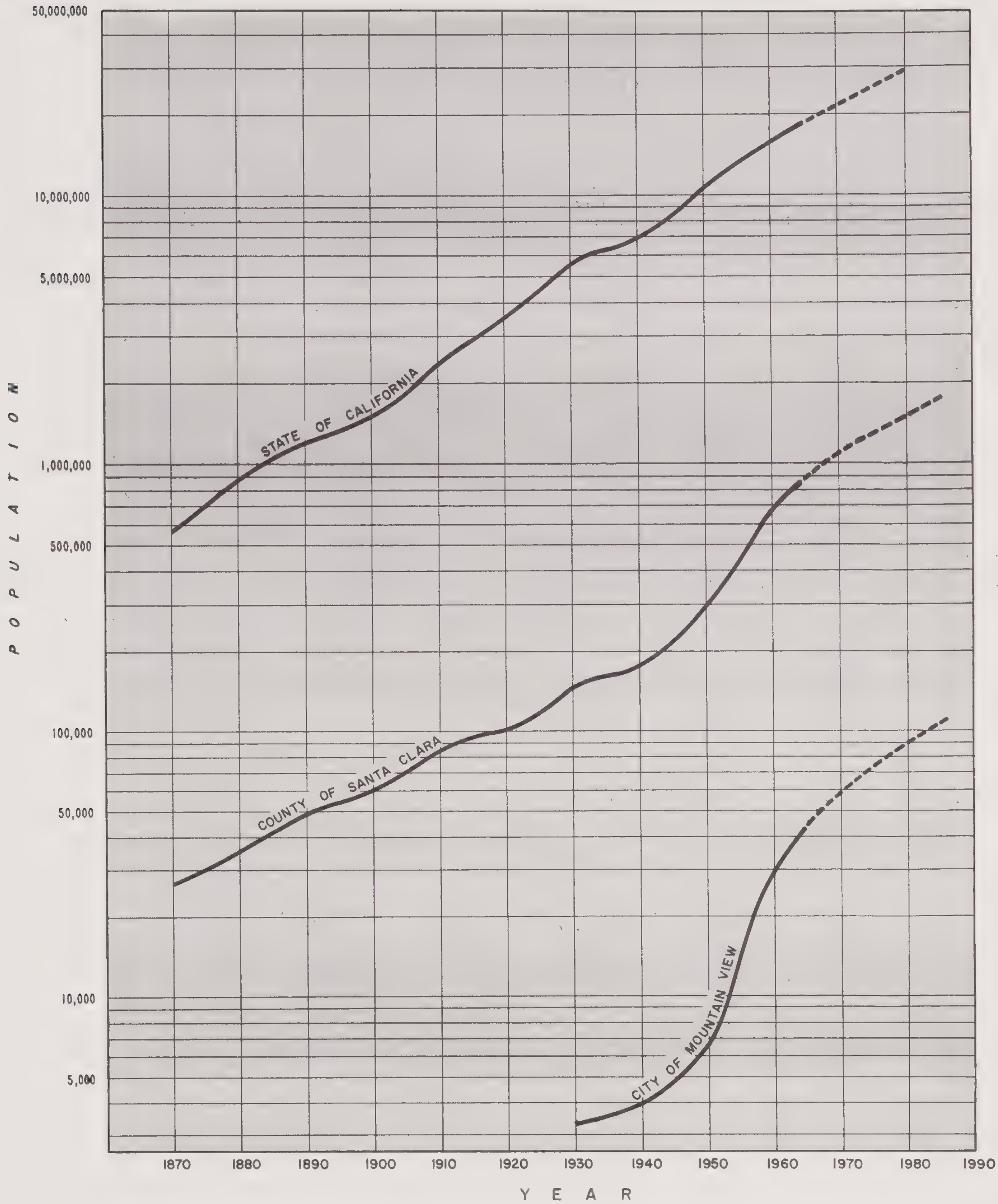
YEAR	MOUNTAIN VIEW (a,b)	SANTA CLARA COUNTY (a,c)	STATE OF CALIFORNIA (a,d)
1870	-	26,246	560,247
1880	-	35,039	864,694
1890	-	48,005	1,213,398
1900	-	60,216	1,485,053
1910	-	83,539	2,377,549
1920	-	100,676	3,426,861
1930	3,308	145,118	5,677,251
1940	3,946	174,949	6,907,387
1950	6,563	290,547	10,586,223
1960	30,889	642,315	15,717,204
1964	43,800	853,500	18,234,000
1970	63,000	1,125,000	21,734,000
1980	91,000	1,590,000	28,137,000
1985	105,000	1,790,000	None Available

Sources: (a) U.S. Census up to 1960

(b) Mountain View, Planning Department

(c) Santa Clara County, Planning Department

(d) California State Chamber of Commerce



POPULATION TRENDS

Table 2

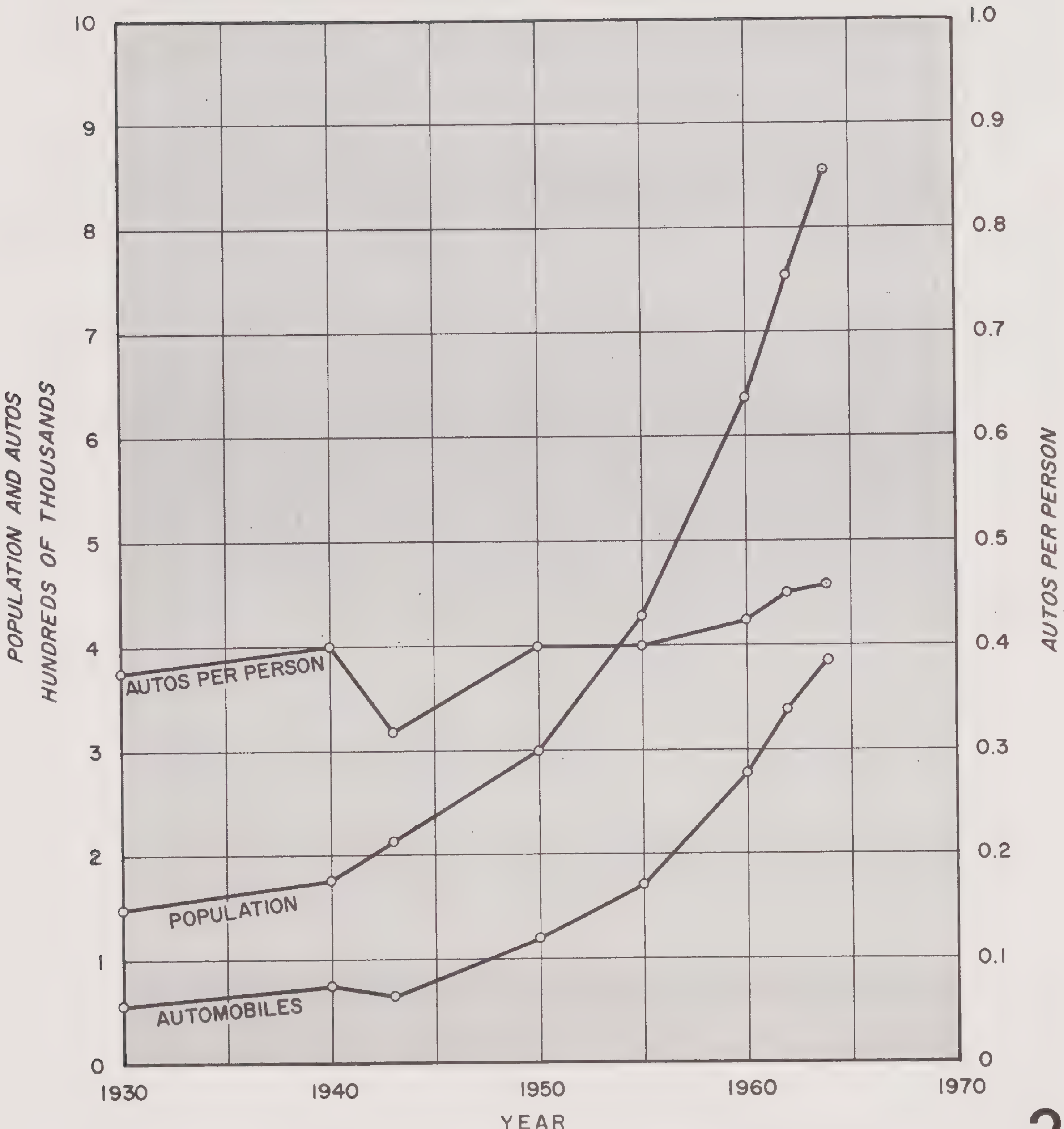
MOTOR VEHICLE REGISTRATIONS, 1930 TO 1964
Santa Clara County, California

YEAR	POPULATION	AUTOMOBILES Registered	AUTOMOBILES Per Person	ALL VEHICLES Registered	ALL VEHICLES Per Person
1930	145,118	53,948	0.37	58,784	0.41
1940	174,949	70,248	0.40	81,701	0.47
1943	211,900 [(a)]	65,537	0.31	77,191	0.36
1950	290,547	115,532	0.40	142,422	0.49
1955	427,900 [(b)]	172,384	0.40	212,480	0.50
1960	642,315	277,960	0.43	343,656	0.54
1962	760,100 [(b)]	338,731	0.45	420,117	0.55
1964	853,500 [(c)]	389,106	0.46	486,418	0.57

Sources: (a) California Taxpayers Association

(b) California Department of Finance

(c) Santa Clara County, Planning Department



2

GROWTH IN AUTOMOBILES, POPULATION, AND AUTOMOBILES PER PERSON
Santa Clara County, California

Population

Employment

Land Use Characteristics

Automobile Ownership

Trip Generation and Attraction Characteristics

Travel Volumes and Characteristics

Trends in Traffic Growth

Major Street Sufficiency

Topographic Conditions

The study area includes more territory than does the Mountain View Planning Area. This is due to the fact that the Planning Area limits are defined by political boundaries; traffic patterns, however, are not limited by these relatively artificial boundaries. Hence, to prepare a comprehensive study of the future traffic requirements of Mountain View, it was necessary to extend the study area into parts of the neighboring communities.

Traffic origin-destination tabulations for 1964 and 1985 were developed indicating the numbers of vehicular trips between traffic zones within the study area. These estimates were based on land use analyses provided by the City Planning Department and field studies conducted by Wilbur Smith and Associates. Actual synthesis of the 1964 and 1985 inter-zonal trips was based on a mathematical model utilizing interaction curves for trip distribution, with base year screen line, cordon, and assignment comparisons made to verify the validity of the model.

Motor vehicle travel desires for 1985 were assigned to major traffic route alternatives, including freeways and expressways in Mountain View, to aid in testing and selecting an optimum system. The final 1985 assignment to the selected arterial network afforded a basis for establishing design requirements.

A long-range major arterial street plan was prepared which provided a balanced circulation and access system in keeping with anticipated generalized land use. Recommended relocations, general functional geometric design standards, and requirements for grade separations are presented here.

In addition to the major street plan, traffic circulation in the central area was studied to determine possible need for one-way circulation, street extensions or reconstruction, or other major traffic control features affecting street capacity. Finally, consideration was given to the effect of possible mass transit development on the Mountain View area.

Previous Studies

Other studies utilized in preparing this report included Trafficway Plan for Santa Clara County, California, by DeLeuw, Cather & Company, 1959; Economic Analysis, Mountain View, California, by Larry Smith & Co., 1964; Insight, by the City of Mountain View Planning Department, 1964; Info, by the County of Santa Clara Planning Department; and Focus on Santa Clara County, by the Bank of America, 1964.

Field Studies

One of the more important investigations undertaken in connection with the Mountain View traffic study was the inventory and projection of study area land use, population, employment, and motor vehicle ownership. This work was undertaken by the City Planning Department and was financed in part by the Federal Housing and Home Finance Agency. Data were developed in such a way as to be of direct use in this traffic study. Their application is discussed later in the report.

The development of travel times on the existing major street system within the study area was undertaken by Wilbur Smith and Associates. Recordings

Chapter II

STREETS, HIGHWAYS, AND TRAFFIC

This chapter gives an account of the regional highway network, both present and proposed, and the existing street and highway system in Mountain View.

Regional Routes

As shown in Figure 3, Mountain View is conveniently accessible to regional highway routes. The Bayshore Freeway (U.S.101) running through the northern portion of the city extends northwest approximately 35 miles to San Francisco. This same freeway passes through San Jose about 15 miles to the southeast, and continues in a southerly direction after interchanging with Interstate 680, known in this area as the Nimitz Freeway to the north and as the Los Gatos Freeway (State Route 17) to the south. Interstate 680 serves traffic traveling between the Monterey Bay to the south and the East Bay and Sacramento areas to the north and beyond, as well as communities en route.

Currently under construction in the Mountain View area are the Stevens Freeway (SR 85) and the Junipero Serra Freeway (Interstate 280).

The Junipero Serra Freeway joins the Los Gatos Freeway in San Jose near Stevens Creek Boulevard. Current construction schedules should see the freeway completed westward to Page Mill Road in Palo Alto and into San Francisco along the general alignment of Junipero Serra Boulevard by 1972. The Stevens Freeway interchanges with the Bayshore Freeway near Moffett Boulevard in Mountain View and will be completed, in the current phase of construction, to join with the Junipero Serra Freeway in the southernmost part of Sunnyvale. Future construction, as yet unprogrammed, will extend the Stevens Freeway in a general southeasterly direction, crossing the Los

MOUNTAIN VIEW
TRAFFIC CIRCULATION STUDY
Wilbur Smith and Associates

LOCATION MAP

Gatos Freeway just north of Los Gatos and extending east to U.S. 101 near Cottle Road in the southern part of San Jose. Also in the future is the "Bay Front Freeway" legislated as State Route 87 which will parallel the Bayshore Freeway on the Bay side between San Francisco and San Jose. At this time, only a mile or two of this route has been adopted (in San Mateo County) and current estimates are that it will not be fully constructed by 1985.

In addition to the nearby freeway routes, other state routes in the Mountain View area are El Camino Real (State Route 82), a major arterial and business street which extends through Mountain View and connects with the various peninsula communities, and the Mountain View-Alviso Road (State Route 237) which starts at El Camino Real opposite Grant Road in Mountain View, interchanges with the Stevens and Bayshore Freeways, and connects with the Nimitz Freeway near Milpitas to the east. These routes are significant not only for their regional service, but also for local access within the community. The same will be true of the Central Expressway which will extend from Santa Clara to Palo Alto when completed, and is currently under construction as part of a county-wide expressway network.

Major Streets

The map of the existing city streets (Figure 4) illustrates the pattern of Mountain View's street system. Although basically rectangular in alignment, particularly in the older central area, it contains a certain amount of curvature and discontinuity in the local and collector streets, as well as some diagonal orientation of arteries. This fact tends to establish and strengthen the utility of the network of rectilinear streets as the major street system.

The principal north-south arteries in the study area are San Antonio Road, El Monte Avenue, Springer Road, Miramonte Avenue, Grant Road, Bernardo Avenue, Rengstorff Avenue, Bailey Avenue, Stierlin Road, Castro Street,

LEGEND

FREEWAY
MAJOR STREETS
LOCAL STREETS

4

NORTH

0 1 2 3 4 5 6

MAP SCALE IN THOUSANDS OF FEET

MOUNTAIN VIEW
TRAFFIC CIRCULATION STUDY
Wilbur Smith and Associates

1964 STUDY AREA STREET SYSTEM

Moffett Boulevard, Calderon Avenue, Whisman Road, Mountain View-Alviso Road, and the Stevens Freeway now under construction.

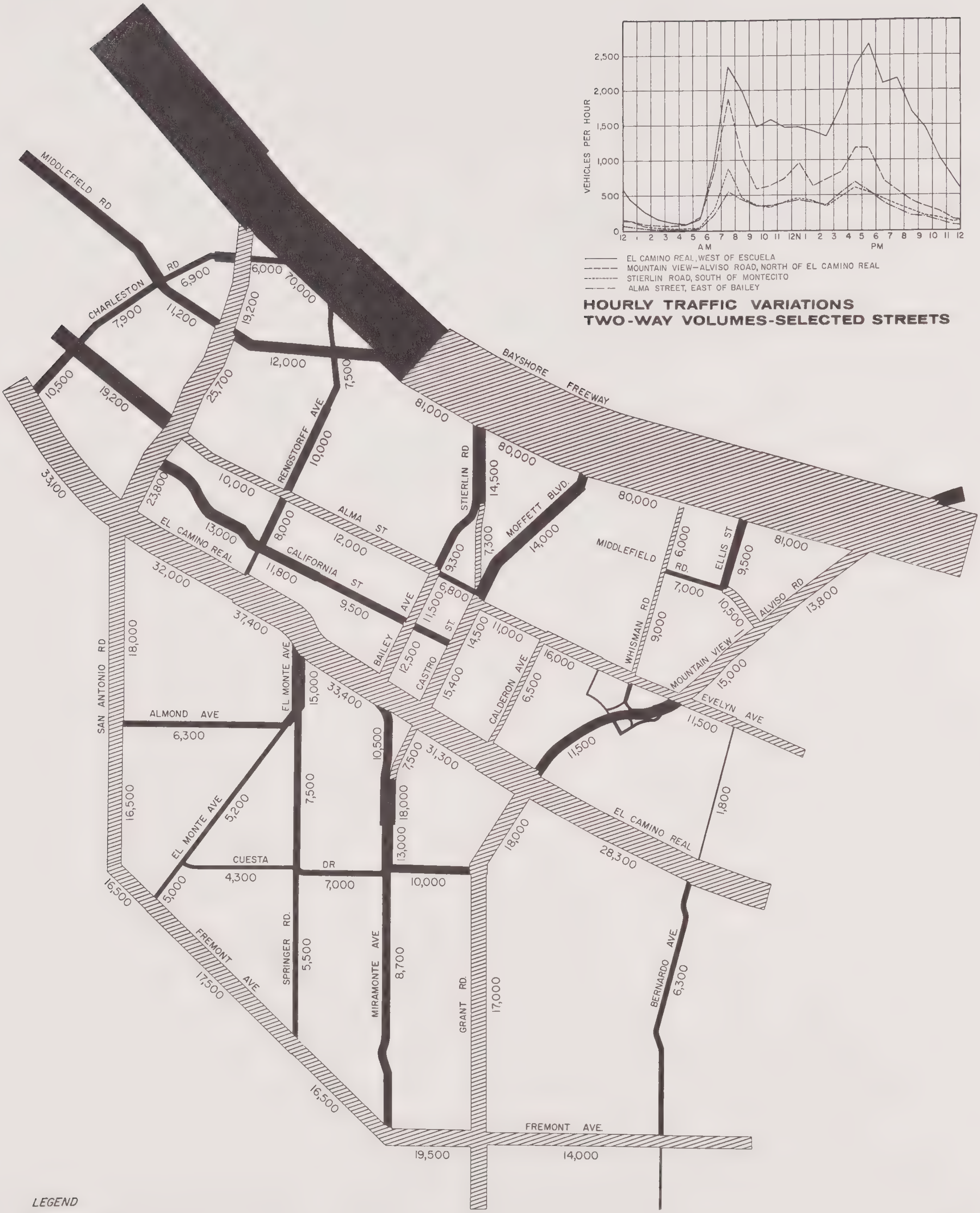
The principal east-west segments of the major street system consist of the Bayshore Freeway, Middlefield Road, Alma Street-Evelyn Avenue (Central Expressway following this alignment is now under construction), California Street, El Camino Real, Cuesta Drive, and Fremont Avenue.

Traffic Volumes

Figure 5 presents the 1964 average daily traffic volumes by means of band widths scaled in proportion to the different volumes. It is evident that the heaviest traffic flows occur in the east-west direction. The three routes carrying the greatest volumes are the Bayshore Freeway, El Camino Real, and the Alma-Evelyn complex. Bayshore Freeway average daily volumes range from 70,000 to 81,000, El Camino Real carries from 28,000 to 37,00, and Alma-Evelyn serves from 7,000 to 19,000.

The principal north-south streets in the study area south of El Camino Real are San Antonio Road, Springer Road Miramonte Avenue, El Monte Avenue, Grant Road, and Bernardo Avenue. The average daily volumes on these streets vary from approximately 5,000 to 8,700 on El Monte, Springer, Bernardo, and the southerly portion of Miramonte. The daily volumes on San Antonio Road and Grant Road vary from 7,000 to 18,000. El Monte directly south of El Camino Real serves 15,000; Miramonte, north of Cuesta, serves 13,000 to 18,000, and approximately 10,500 directly south of El Camino Real.

Between El Camino Real and the Bayshore Freeway in the study area, the north-south traffic is carried on Charleston Road, San Antonio Road, Rengstorff Avenue, Bailey Avenue, Castro Street, Stierlin Road, Moffett Boulevard, Whisman Road, and Mountain View-Alviso Road, with volumes ranging from approximately 12,000 to 26,000 daily.



HOURLY TRAFFIC VARIATIONS
TWO-WAY VOLUMES-SELECTED STREETS

LEGEND

OVER PRACTICAL CAPACITY

TRAFFIC SCALE

40,000 30,000 20,000 10,000 5,000

VEHICLES PER DAY, AVERAGE DAILY TRAFFIC

1964 TRAFFIC VOLUMES

5

NORTH

0 1 2 3 4 5 6

MAP SCALE IN THOUSANDS OF FEET

MOUNTAIN VIEW
TRAFFIC CIRCULATION STUDY
Wilbur Smith and Associates

Knowledge of volumes and variations in traffic flow during the day is important to planning and design. Peak traffic demands in vehicles per hour per lane are especially important in considering practical problems concerning operation. Various studies of the daily patterns of traffic flow have indicated a high degree of stability, so that the relative traffic volumes by hours are quite consistent at a given location. Daily time patterns of traffic flow on some major thoroughfares in the Mountain View study area are listed in Table 3 as traffic volumes per hour and percentages of total flow for each hour. These typical weekday hourly traffic variations are also illustrated in Figure 5.

The peak hour percentages of 24-hour traffic vary from 8.6 to 13.0 percent as shown. These values are typical of those found on similar streets in other cities. The fluctuations in hourly rates show the usual correlation with the business, industrial, and commercial activity of the community. The peak morning flows occur between 7:00 A.M. and 8:00 A.M. and smaller peaks occur about midday. The evening peak occurs about 5:00 P.M. and is seen to constitute the heaviest traffic period, with about 10 percent of the daily flow on Alma Street. A lesser 8.6 percent peak occurs on El Camino Real. This lower figure is indicative of the high degree of local activity throughout the entire day on El Camino Real, whereas the Mountain View-Alviso Road serving primarily as a connection to industrial complexes in Mountain View, Sunnyvale, and Milpitas, has a more pronounced peak of 13 percent. Thus, it is important to consider the relationship of the peak hour to the 24-hour volumes for different routes. Generally, as the daily traffic volumes increase, the peak hour percentages decrease.

Traffic Capacity vs. Volumes

A knowledge of the traffic carrying capacity of each of the several types and numerous dimensions of the existing roadways in the Mountain View study area is an essential tool in determining the level of service pro-

Table 3

HOURLY TRAFFIC VOLUME VARIATIONS - 1964
Mountain View Traffic Circulation Study

HOUR BEGINNING	MOUNTAIN VIEW - ALVISO ROAD NORTH OF EL CAMINO REAL		ALMA STREET EAST OF BAILEY		EL CAMINO REAL WEST OF ESCUELA		STIERLIN ROAD SOUTH OF MONTECITO	
	Veh.	Pct.	Veh.	Pct.	Veh.	Pct.	Veh.	Pct.
12:00 Midnight	142	1.0	55	0.8	443	1.4	149	2.0
1:00 A.M.	97	0.7	28	0.4	267	0.9	58	0.8
2:00	77	0.5	14	0.2	154	0.5	36	0.5
3:00	63	0.4	11	0.2	116	0.4	27	0.4
4:00	96	0.7	10	0.2	96	0.3	30	0.4
5:00	202	1.4	33	0.5	163	0.5	44	0.6
6:00	842	5.8	224	3.3	909	2.9	302	4.0
7:00	1,876	13.0	551	8.1	2,346	7.5	880	11.6
8:00	1,040	7.2	446	6.5	1,981	6.3	457	6.0
9:00	597	4.1	346	5.1	1,475	4.7	358	4.7
10:00	641	4.4	367	5.4	1,583	5.1	339	4.5
11:00	746	5.2	402	5.9	1,467	4.7	405	5.4
12:00 Noon	962	6.7	436	6.4	1,482	4.8	454	6.0
1:00 P.M.	630	4.4	400	5.9	1,410	4.5	425	5.6
2:00	727	5.0	369	5.4	1,334	4.3	346	4.6
3:00	832	5.8	541	8.0	1,761	5.7	487	6.4
4:00	1,180	8.2	690	10.1	2,338	7.5	608	8.0
5:00	1,173	8.1	560	8.2	2,664	8.6	544	7.2
6:00	716	5.0	399	5.8	2,099	6.7	448	5.9
7:00	576	4.0	305	4.5	2,155	6.9	364	4.8
8:00	431	3.0	205	3.0	1,682	5.4	296	3.9
9:00	346	2.4	190	2.8	1,462	4.7	204	2.7
10:00	274	1.9	148	2.2	1,033	3.3	176	2.3
11:00	158	1.1	73	1.1	737	2.4	130	1.7
Total	14,424	100.0	6,803	100.0	31,157	100.0	7,567	100.0

vided and the requirements for the design of new facilities. Traffic capacities shown in Tables 4, 5, and 6 reflect ranges of capacity for collector streets, arterials, freeways, and expressways, respectively. These motor vehicle traffic capacities are based on Highway Research Board findings [1] with upward adjustments based on subsequent research. The freeway capacities are based on A Policy on Arterial Highways in Urban Areas, published by the American Association of State Highway Officials. The term "practical capacity" as used here is defined as the maximum number of vehicles which can pass a given point on a roadway without unreasonable delays, hazards, or other restrictions being imposed on drivers. A more detailed analysis of the capacity of an individual street requires a study of the characteristics of the street to determine the particular conditions influencing its traffic capacity. Capacity is governed by the elements of design and by operational characteristics of which the number of moving lanes and amount of cross traffic are primary controlling factors. Other important factors include the width of lanes, alignment, gradient, lateral clearance, shoulder width, extent of directional turning movements, percentage of commercial traffic, and interference from pedestrians and parked or standing vehicles.

Basic assumptions are necessary in establishing the capacity standards shown in the tables. For design purposes, the following assumptions were made for average or typical traffic conditions: 9 to 13 percent of the average daily traffic occurs during the peak hours; 55-60 percent of the peak hour traffic is in the predominant direction of travel; 10 percent of the traffic is composed of commercial vehicles; 20 percent of the flow makes turning movements; and the minimum main street green time for signals is 55 percent on arterials, 35 percent on collectors, and 65 percent on expressways at grade.

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[1] Highway Capacity Manual, U.S. Department of Commerce, 1958.

Table 4

PRACTICAL CAPACITY CRITERIA, TWO-WAY COLLECTOR STREETS
Mountain View Traffic Circulation Study

ROADWAY WIDTH (feet)	VEHICLES PER DAY With Parking	VEHICLES PER DAY Without Parking
20-24		3,500 - 4,500
26-30		5,000 - 6,000
32-36	4,500 - 5,200	6,500 - 7,300
38-42	5,600 - 6,300	7,800 - 8,700
44-48	6,600 - 7,300	9,200 - 9,900
50-54	7,600 - 8,300	10,400 - 11,300
56-60	8,600 - 9,300	11,700 - 12,400
62-66	9,600 - 10,200	12,900 - 13,700
68-72	10,500 - 11,200	14,100 - 14,900
74-78	11,500 - 12,200	15,300 - 16,200
80-84	12,500 - 13,200	16,600 - 17,400
86-90	13,400 - 14,000	17,800 - 18,500
92-96	14,300 - 15,000	18,900 - 19,700

Note: Above values based on the following: peak hour = 12 percent of A.D.T.; left turns = 10 percent; right turns = 10 percent; commercial traffic = 10 percent; signal green time = 35 percent; one direction volume two-thirds of other in peak hour.

Table 5

PRACTICAL CAPACITY CRITERIA, TWO-WAY ARTERIAL STREETS
Mountain View Traffic Circulation Study

ROADWAY WIDTH (feet)	VEHICLES PER DAY With Parking	Without Parking
20-24		5,500 - 7,000
26-30		7,800 - 9,400
32-36	7,000 - 8,200	10,200 - 11,600
38-42	8,800 - 9,800	12,200 - 13,700
44-48	10,400 - 11,500	14,400 - 15,700
50-54	12,000 - 13,000	16,400 - 17,700
56-60	13,500 - 14,500	18,400 - 19,600
62-66	15,100 - 16,000	20,300 - 21,600
68-72	16,500 - 17,500	22,200 - 23,400
74-78	18,100 - 19,100	24,100 - 25,400
80-84	19,700 - 20,700	26,100 - 27,300
86-90	21,000 - 21,900	28,000 - 29,100
92-96	22,400 - 23,500	29,800 - 31,000

Note: Above values based on the following: peak hour = 12 percent of A.D.T.; left turns = 10 percent; right turns = 10 percent; commercial traffic = 10 percent; signal green time = 55 percent; one direction volume two-thirds of other in peak hour.

Table 6

PRACTICAL CAPACITY CRITERIA, FREEWAYS AND EXPRESSWAYS
Mountain View Traffic Circulation Study

TYPE FACILITY	VEHICLES PER HOUR	VEHICLES PER DAY
Eight-Lane Urban Freeway[(a)]	8,000 - 10,000	80,000 - 100,000
Six-Lane Urban Freeway	6,000 - 7,500	60,000 - 75,000
Four-Lane Urban Freeway	4,000 - 5,000	40,000 - 50,000
Six-Lane Urban Expressway[(b)]	3,000 - 5,300	30,000 - 53,000
Four-Lane Urban Expressway	2,000 - 3,500	20,000 - 35,000

(a) Freeway: Divided roadway with full control of access

(b) Expressway: Divided roadway with partial control of access

Note: Calculations based on 60 percent green signal period, 10 percent commercial vehicles, 20 percent combined left and right hand turns, one direction volume two-thirds of other in peak hour, and 9 to 10 percent peak-hour relation to 24-hour volume.

The Mountain View study area has a high incidence of improved intersections, including additional through and turning lanes, channelization, and in some cases, grade separation. This type of improvement adds substantially to the roadway capacity because the capacity of an urban street is, for all practical purposes, limited to the capacity of its intersections. Improved intersections are underlined in the street inventory (Table 7).

Volume-capacity figures in Table 7 show that certain routes in the Mountain View area are currently carrying vehicle volumes in excess of their practical capacity levels. Included in these overloaded routes are San Antonio Road, El Camino Real, Castro Street, Grant Road, Fremont Avenue, and unimproved sections of Bailey Avenue, Alma Street, Evelyn Avenue, and Mountain View-Alviso Road. Such loads are being accommodated at the expense of driver convenience and freedom of movement as manifested by traffic congestion during periods of heavy flow. These over-capacity street sections are also shown in Figure 5 by means of contrasting portions of the traffic flow bands.

Right-of-Way and Pavement Widths

The right-of-way widths on principal north-south streets vary widely, from a minimum of 40 feet (except for a portion of Phyllis Avenue, which is 30 feet), up to 100 feet. Moffett Boulevard has a right-of-way width of 86 feet, and a portion of Miramonte Avenue within Mountain View is 100 feet in width. The rights-of-way for east-west streets also vary upward from 40 feet, but are generally wider than the north-south street rights-of-way.

The band widths shown in Figure 6 represent the rights-of-way making up the existing street and highway network in the study area. The numerical values of these rights-of-way and pavement widths are also indicated in Table 7.

Table 7

MAJOR STREET INVENTORY - 1964
Mountain View Traffic Circulation Study

TRAFFICWAY	LIMITS	RIGHT OF WAY	MINIMUM PAVEMENT WIDTH	NUMBER OF MOVING LANES	CURB USE	CLASSIFICATION	1964 ADT	PRACTICAL CAPACITY (24-HOUR VOLUME)	CONGESTED	REMARKS
Alma Street	Charleston - San Antonio	80'	45'	2E,2W	c	E	19,200	25,000		
	San Antonio - Rengstorff	90' Min.	30'	1E,1W	b,d	A	10,000	9,400	X	
	Rengstorff - Bailey	40'- 90'	40'	1E,1W	b,d	A	12,000	11,100	X	
	Bailey - Moffett	40'	40'	1E,1W	b	A	6,800	11,100		
Bailey Avenue	El Camino Real - California	60'	32'	1N,1S	a,c	A	12,500	7,000	X	
	California - Alma	60'- 90'	32'	1N,1S;2N,2S	a	A	11,500	7,000	X	2N,2S from Alma for 300' South
	Alma - Stierlin	40'- 90'	31'	1N,1S;2N,2S	a,d	A	9,300	19,600		2N,2S except for 450' section, vicinity of Jackson St.
Bayshore Freeway	San Antonio - Rengstorff	230' Min.		3E,3W	c	F	70,000	75,000		
	Rengstorff - Middlefield	200' Min.		3E,3W	c	F	74,000	75,000		
	Middlefield - Stierlin	260' Min		3E,3W	c	F	81,000	75,000	X	
	Stierlin - Moffett	230' Min.		3E,3W	c	F	80,000	75,000	X	
	Moffett - Ellis	150' Min.		3E,3W	c	F	80,000	75,000	X	
	Ellis - Mountain View/Alviso	150' Min.		3E,3W	c	F	81,000	75,000	X	
Bernardo Avenue	Fremont - El Camino Real	55'-100'	26'	1N,1S;2N,2S	a,b,d,	A	6,300	7,800		1N,1S, Fremont-Remington, 2N,2S, Remington-El Camino Real
	El Camino Real - Evelyn	50'- 86'	21'	1N,1S	a,b,d	A	1,800	5,900		
Calderon Avenue	El Camino Real - Evelyn	60'- 90'	28'	1N,1S;2N,2S	a,b,d	C	6,500	5,000	X	1N,1S, El Camino Real-Dana; 2N,2S, Dana-Evelyn
California Street	San Antonio - Rengstorff	90'	68'	2E,2W	a	C	13,000	20,000		
	Rengstorff - Bailey	60'- 90'	32'	1E,1W;2E,2W	a	C	11,800	7,000		2E,2W from Rengstorff to East of Mariposa; then 1E,1W to Bailey
	Bailey - Castro	60'	32'	1E,1W	a	C	7,800	7,000		
Castro Street	Miramonte - El Camino Real	40'- 80'	22'	1N,1S	a,b,c,d	A	7,500	6,300	X	
	El Camino Real - California	70'- 80'	50'	2N,2S	a	A	15,400	12,000	X	
	California - Evelyn	66'	60'	2N,2S	a	A	14,500	14,500	X	
Charleston Road	El Camino Real - Alma	86'	52'	2N,2S	a,b	A	10,500	12,500		
	Alma - Middlefield	86'	60'	2N,2S	b	A	7,900	16,500		
	Middlefield - San Antonio	86'	60'	2N,2S	a	A	6,900	14,500		
	San Antonio - Bayshore Freeway	60'- 90'	60'	2E,2W	a	A	6,000	14,500		
Cuesta Drive	Springer - Miramonte	90'	64'	2E,2W	a	A	7,000	15,600		
	Miramonte - Grant	65'- 75'	37'	1E,1W	b	A	10,000	10,100		
El Camino Real	Charleston - San Antonio	100'-110'	56'	2E,2W	a,b,d	A	33,100	18,400	X	
	San Antonio - Rengstorff	100-110'	58'	2E,2W	a,b,d	A	32,000	19,000	X	
	Rengstorff - El Monte	100' Min.	58'	2E,2W	a,b,d	A	37,400	19,000	X	
	El Monte - Bailey	100'-110'	58'	2E,2W	a,b,d	A	33,400	19,000	X	
	Bailey - Castro	100'	58'	2E,2W	a,b,d	A	28,100	19,000	X	
	Castro - Phyllis	82'-110'	58'	2E,2W	a,b,d	A	31,300	19,000	X	
	Phyllis - Grant	100-110'	58'	2E,2W	a,b,d	A	37,000	19,000	X	
	Grant - Bernardo	100' Min.	58'	2E,2W	a,b,d	A	28,300	19,000	X	
Ellis Street	Middlefield - Fairchild	80'- 90'	70'	2N,2S	a	A	9,500	17,000		
El Monte Avenue	Almond - Springer	50'	29'	1N,1S	d	A	10,000	18,000		
	Springer - El Camino Real	40'- 75'	26'	1N,1S	b,c,d	A	15,000	15,600		

Evelyn Avenue	Castro - Calderon	60'- 86'	34'	1E,1W;2W,1E	b	A	11,000	9,300	X	1E,1W from Castro - 600' East of Calderon; then 2W, 1E to Calderon
	Calderon - Whisman	50'- 86'	24'	1E,1W	b,d	A	16,000	7,000	X	
	Whisman - Bernardo	50'- 86'	23'	1E,1W	d	A	11,500	6,600	X	
Fremont Avenue	Springer - Miramonte	60'- 70'	25'	1E,1W	b,d	A	16,500	7,400	X	
	Miramonte - Grant	60'- 90'	24'	1E,1W	c,d	A	19,500	7,000	X	
	Grant - Bernardo	60'-120'	30'	1E,1W	d	A	19,000	9,400	X	
Grant Road	Fremont - Cuesta	60'- 75'	36'	1N,1S	b,d	A	17,000	11,600	X	
	Cuesta - El Camino Real	60'- 90'	36'	1N,1S;1N,2S	b,d	A	18,000	11,600	X	1N,2S for 1000' south from El Camino Real
Middlefield Road (Western Section)	Charleston - San Antonio	86'	60'	2E,2W	a	A	11,200	14,500		
	San Antonio - Rengstorff	90'	60'	2E,2W	a	A	12,000	14,500		
	Rengstorff - Bayshore Freeway	60'- 90'	30'	1E,1W;2E,2W	a,d	A	13,000	9,400		2E,2W, Rengstorff to 300' East of Bayshore Freeway; then 1E,1W
(Eastern Section)	Whisman - Ellis	100'	80'	3E,2W	a	C	7,000	12,500		1E Lane for left turn traffic to Ellis
	Ellis - Mountain View/Alviso	100'	50'	2E,2W	a,d	C	10,500	10,400	X	
Miramonte Avenue	Fremont - Cuesta	40'- 75'	24'	1N,1S;2N,2S	b,d	A	8,700	14,000		1N,1S, Fremont-Rose; 2N,2S, Rose-Cuesta
	Cuesta - Castro	40'- 90'	34'	1N,1S;2N,2S	a,b,d	A	18,000	18,600		2N,2S, Cuesta-Hans; 1N,1S, Hans-Castro
	Castro - El Camino Real	40'-100'	32'	1N,1S;1N,2S; 2N,2S	a,b,d	A	10,500	20,400		1N,1S, Castro-Harpster; 1N,2S, Harpster-Park; 2N, 1S, Park-El Camino Real
Moffett Boulevard	Alma - Bayshore Cut-Off	86'	52'	2S,1N;2N,2S	a,d	A	14,000	17,000		2N,2S, Alma-Central
Mountain View-Alviso Road	El Camino Real - Middlefield	40' Min.	35'	1N,1S;2N,2S	c,d	A	15,000	11,200	X	Constructed to Freeway Standards between Centre and Bernardo
	Middlefield - Bayshore Freeway	40' Min.	35'	1N,1S;2N,2S	d	A	13,000	11,200	X	2N,2S at approach to Bayshore Freeway
Phyllis Avenue	El Camino Real - Grant	30'- 90'	19'	1S;2N,2S	a,b	A	3,000	4,500		2N,2S, Pamela to Barbara
Rengstorff Avenue	El Camino Real - California	40'- 90'	28'	1N,1S;2N,2S	a,b,d	A	3,500	8,400		
	California - Alma	40'- 90'	23'	1N,1S	a,d	A	8,000	13,200		
	Alma - Middlefield	40'- 90'	24'	1N,1S;1N,2S	a,b,d	A	10,000	14,000		1N,1S to Middlefield from 1200' N. of Alma
	Middlefield - Bayshore Freeway	40' Min.	24'	1N,1S;2N,2S	a,b,d	A	5,000	14,000		1N,1S to Bayshore from 150'N. of Middlefield
San Antonio Road	Almond - El Camino Real	40'- 70'	24'	1N,1S;2N,2S	d,b	A	18,000	14,000	X	1N,1S, Almond-Portola, 2N,2S, Portola-El Camino Real
	El Camino Real - California	120'	80'	3N,3S	c	A	23,800	21,300	X	
	California - Alma	120' Min.	60'	2N,2S	c,b	A	24,000	19,600	X	
	Alma - Middlefield	120' Min.	60'	2N,2S	c	A	25,700	19,600	X	
	Middlefield - Charleston	104'-130'	58'	2N,2S	a,b	A	19,200	16,500	X	
	Charleston - Bayshore Freeway	120' Min.	42'	1N,1S;2N,2S	a,d	A	17,500	13,000	X	1N,1S to Bayshore Freeway from 450' N. of Charleston
Springer Road	Fremont - Cuesta	40'- 70'	26'	1N,1S,2S,1N	a,b,d	A	5,500	7,800		1N,1S, Fremont-Rose; 2S, 1N, Rose-Cuesta
	Cuesta - El Monte	40'- 90'	28'	1N,1S;2S,1N	a,b,d	A	7,500	8,400		2S,1N, Cuesta-Paco; 1N,1S, Paco-El Monte
Stierlin Road	Alma - Bailey	62.5'	24'	1N,1S	a,d	A	7,300	7,000	X	
	Bailey - Bayshore Freeway	40'- 90'	24'	1N,1S;1N,2S; 2N,2S	a,b,d	A	14,500	18,000		1N,1S, Bailey-Middlefield Extension; 1N,2S to Terra Bella; 2N,2S to Bayshore Freeway
Whisman Road	Evelyn - Middlefield	40'- 80'	23'	1N,1S	b,d	C	9,000	4,200	X	
	Middlefield - Fairchild	40'- 80'	22'	1N,1S	b,d	C	6,000	4,000	X	
	Evelyn - Mountain View/Alviso Road	80'	70'	2N,2S	a	A	6,000	17,000		

Notes: 1) Underlined streets (under LIMITS) indicate intersections improved with additional lanes, channelization, etc.

2) CURB USE Legend:
- a = parking 2 sides
- b = parking 1 side
- c = parking prohibited
- d = unimproved roadside

3) CLASSIFICATION:
- A = Arterial Street
- C = Collector Street
- E = Expressway
- F = Freeway

4) Major Capacity Restraining Conditions Underlined (Number of Moving Lanes, Curb Use).

6

ARTERIAL NETWORK RIGHTS-of-WAY

MOUNTAIN VIEW
TRAFFIC CIRCULATION PLAN
Wilbur Smith and Associates

Inadequate right-of-way widths, variations in widths of pavement, and right-of-way, and gaps in the existing street network occur in some cases because of the existing local policy which combines widenings and street improvements with development of the abutting property. It is quite common to find significantly different rights-of-way and street widths from block to block, and even within blocks. Also, the roadway widths and pavement conditions on many neighborhood streets serving local traffic only are more adequate and in better condition than various arterial streets serving significantly more people.

The following tabulation presents some characteristic street system deficiencies for illustrative purposes:

LOCATION	REMARKS
Stierlin Road - Bailey to Terra Bella	Narrow pavement and right-of-way in mid-block sections serving heavy flow
Phyllis Avenue - one-way portion between Grant and El Camino	Present 30-foot right-of-way, future arterial route
Phyllis - Calderon intersection with El Camino Real	Offset intersection
Middlefield Road - throughout Mountain View	Discontinuous
Evelyn-Whisman intersection	Narrow pavements serving heavy flows resulting in congestion
Rengstorff Avenue - Alma to Middlefield	Narrow pavements in poor structural condition

In the face of increasing traffic needs, such deficiencies as indicated above can be expected to increase in significance and only the acquisition of additional right-of-way together with street widening will satisfy the needs.

Improvements necessary to forestall 1985 deficiencies are presented in Chapter V in the discussion of the arterial street plan.

Traffic Controls and Regulations

There are 36 street and highway intersections controlled by traffic signals in the study area, 17 operated by the City of Mountain View, 6 along El Camino Real operated by the State Highway Division, and the remainder under the jurisdiction of neighboring communities at locations along Charleston Road, San Antonio Road north of Alma and south of El Camino Real, and Fremont Avenue. All of the traffic signal installations in the city of Mountain View control operations along eight streets; namely: Rengstorff Avenue, El Camino Real, California Street, San Antonio Road, Miramonte Avenue, Bailey Avenue, Castro Street, and Grant Road, which has a flashing signal installed at its intersection with Cuesta Drive. The locations of these traffic signals are shown in Figure 7. Also indicated are proposed future installations on Castro Street at Mercy Street and Central Expressway.

Vehicle actuated equipment is most common in this area. Only six signal-controlled intersections in this study area are equipped with pre-timed controllers. They exist in the central area along Castro Street and Bailey Avenue. Such control does not permit the flexibility of variable signal phasing for fluctuating traffic demands, although it offers, in the case of these streets, the possibility of progressive traffic movement in the downtown area, assuming proper interconnection and programming.

At the present time, there are no one-way street pairs in Mountain View. However, parts of Phyllis Avenue between El Camino Real and Pamela Drive, and between Hans Avenue and Grant Road, are restricted to one-way flow southbound, because of the extremely narrow existing roadway sections.

LEGEND

- ◂ STOP SIGN (SHOWN ONLY AT MAJOR STREETS)
- ○ FULL-VEHICLE-ACTUATED SIGNAL CONTROL
- ◐ SEMI-VEHICLE-ACTUATED SIGNAL CONTROL
- ● PRE-TIMED SIGNAL CONTROL
- ⊗ FLASHING SIGNAL CONTROL
- ◎ PROPOSED SIGNAL CONTROL

7

NORTH

0 1 2 3 4 5 6

MAP SCALE IN THOUSANDS OF FEET

MOUNTAIN VIEW
TRAFFIC CIRCULATION STUDY

Wilbur Smith and Associates

TRAFFIC CONTROLS - 1964

In addition to the signalized intersections, traffic is also regulated by stop signs at many other locations, as shown on Figure 7. In this illustration, stop signs at major street locations, only, are shown.

Future traffic growth will undoubtedly warrant the installation of many additional stop signs and traffic signals.

Travel Speeds

It is generally agreed that an adequate major street system should provide for overall average speeds of about 35 m.p.h. on arterials and about 25 m.p.h. on collector streets during off-peak periods. Local major streets, such as Castro Street, can be anticipated to operate at somewhat lower speeds.[2]

The results of the analysis of the travel time data are summarized in Table 8. In general, operating speeds of the major streets north of El Camino Real are adequate. El Camino Real exhibits operating speeds lower than desirable. The lack of curbs, large number of traffic signals, and the extensive strip development along this four-lane route contribute to below-normal operating speeds. South of El Camino Real, San Antonio Road, Grant Road, and Fremont Avenue have sub-standard operating speeds because of high volumes on narrow and unimproved roadways.

Accident Experience

Figure 8 indicates the number and location of personal injury and property damage accidents reported for the year 1964 in the City of Mountain View. Included also are accidents on some major arterials outside the Mountain View City limits but pertinent to this study. Accident details were obtained

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2 Standards for Street Facilities and Services, National Committee on Urban Transportation, 1958

Table 8

OFF-PEAK OPERATING SPEEDS
WEEKDAY, NOVEMBER, 1964
Mountain View Traffic Circulation Study

ROUTE	SECTION	SPEED (MPH)
Alma Street	Charleston - Moffett	26
Almond Avenue	San Antonio - El Monte	21
Castro Street	Alma - Miramonte	27
Charleston Road	Alma - Bayshore Freeway	25
El Camino Real	Adobe Creek - San Antonio	21
	San Antonio - El Monte	21
	El Monte - Castro	22
	Castro - Grant/Alviso	24
	Grant/Alviso - Bernardo	25
Evelyn Avenue	Castro - Bernardo	27
Fremont Avenue	Campbell - Miramonte	22
	Miramonte - Stevens Creek	26
Grant Road	El Camino Real - Fremont	23
Middlefield Road	Charleston - Bayshore Freeway	24
Miramonte Avenue	El Camino Real - Cuesta	32
	Cuesta - Fremont	30
Moffett Boulevard	Bayshore Freeway - Alma	31
Mountain View - Alviso Road	Bayshore Freeway - El Camino Real	34
Rengstorff Avenue	Bayshore Freeway - Alma	26
	Alma - El Camino Real	26
San Antonio Road	Bayshore Freeway - Alma	33
	Alma - El Camino Real	26
	El Camino Real - Almond	21
Springer	El Camino Real - Cuesta	32
	Cuesta - Fremont	31
Stierlin Road - Bailey Avenue	Bayshore Freeway - Alma	30
	Alma - Castro	26

LEGEND

○	PROPERTY DAMAGE ACCIDENT
•	PERSONAL INJURY ACCIDENT
×	FATALITY

8

NORTH

0 1 2 3 4 5 6

MAP SCALE IN THOUSANDS OF FEET

MOUNTAIN VIEW
TRAFFIC CIRCULATION STUDY
Wilbur Smith and Associates

1964 TRAFFIC ACCIDENTS

from the Mountain View City Police Department, the State of California Division of Highways, and the cities of Palo Alto, Los Altos, and Sunnyvale. Accidents on several of the major routes are summarized in Table 9, and ratios have been developed on the basis of vehicle-miles of exposure and miles of roadway.

Eight sections of roadway were analyzed with reference to traffic accidents. On the arterial routes the average annual injury accident rate per 100-million vehicle miles was found to be 119; the average annual number of accidents per mile of roadway was 8.3. Based on standards developed nationally,[3] the accident rates on major arterial streets should not exceed 6 fatal and 200 personal injury accidents per 100-million vehicle miles. On the Bayshore Freeway, the injury accident rate was 53 and the number of injury accidents per mile of roadway was 15.4 during 1964. Freeway standards developed by the National Committee on Urban Transportation are 2.0 fatalities and 60 injury accidents per 100-million vehicle miles.

Seen in Table 9 is the fact that all but three of the sections analyzed meet these suggested standards. Consequently, these three sections could be classified as unduly hazardous. It should be noted that the sections reported in Table 9 are presented in decreasing order of magnitude of injury accident ratio, with the implication that all other routes within the City of Mountain View are less hazardous. The most hazardous section (based on vehicle-miles of service) was Castro Street between El Camino Real and Evelyn Avenue; the accident rate was 376 injury accidents per 100 million vehicle miles, well above the acceptable 200.

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[3] Ibid.

Table 9

TRAFFIC ACCIDENTS ON PRINCIPAL ROUTES - 1964
Mountain View Traffic Circulation Study

ARTERIAL ROUTE	LIMITS	LENGTH (miles)	1964 ADT	100 MILLION VEHICLE MILES	ALL REPORTED ACCIDENTS	INJURY ACCIDENTS	VEHICLE MILE INJURY RATE[a]	ROUTE MILE INJURY RATE[b]
Castro Street	El Camino Real - Evelyn	0.68	14,500-15,400	0.0374	40	14	376	20.6
Bailey Avenue	El Camino Real - Alma	0.74	11,500-12,500	0.0325	31	7	216	9.5
Moffett Boulevard	Alma - Bayshore Cutoff	0.91	14,000	0.0465	28	9	193	9.9
Rengstorff Avenue	El Camino Real - Bayshore Fwy.	1.89	3,500-10,000	0.0508	49	18	181	9.5
El Camino Real	San Antonio - Bernardo	4.49	28,100-37,400	0.5263	212	58	110	12.9
Miramonte Avenue	Cuesta - El Camino Real	1.00	10,500-18,000	0.0519	20	4	77	4.0
San Antonio Road	El Camino Real - Alma	0.57	23,600-29,000	0.0492	23	3	61	5.3
Average							119	8.3
FREEWAY ROUTE								
Bayshore Freeway	San Antonio - Mountain View/ Alviso Road	4.03	70,000-81,000	1.1702	179	62[c]	53	15.4

(a) Per 100 million vehicle miles
(b) Per mile of roadway
(c) Includes two fatalities

An inventory of all intersection sccidents reveals that the two most hazardous intersections are both on El Camino Real, at its junction with Grant/Alviso, and at its junction with San Antonio. The highest frequency of injury accidents was recorded at the intersections of El Camino Real at Grant/Alviso, Alma at Moffett, and California at Castro,with seven each. These intersections are listed in Table 10, which summarizes intersections with more than five accidents during the year.

Accident totals have been increasing. There were 675 accidents reported in Mountain View in 1962, 754 during 1963, and 831 in 1964. However, it is encouraging to note that the rate of increase was less in 1964 than in the preceding year. An 11.7 percent increase in the number of accidents occurred during 1963, whereas 1964 showed a 9.3 percent increase over the number of accidents reported in 1963.

Table 10

TRAFFIC ACCIDENTS AT INTERSECTIONS - 1964
Mountain View Traffic Circulation Study

INTERSECTION	TOTAL NO. ACCIDENTS[a]	PERSONAL INJURY ACCIDENTS
El Camino Real @ Grant/Alviso	22	7
El Camino Real @ San Antonio	18	1
El Camino Real @ Bailey	15	5
Alma @ Moffett	13	7
El Camino Real @ Rengstorff	12	3
Alma @ Rengstorff	11	6
California @ Rengstorff	10	5
El Camino Real @ Clark	10	5
El Camino Real @ Escuela	10	5
El Camino Real @ Calderon-Phyllis	9	4
Bailey @ California	9	2
Cuesta @ Grant	9	2
Montecito @ Sierra Vista	8	4
California @ San Antonio	8	2
California @ Castro	7	7
El Camino Real @ Bay	7	6
El Camino Real @ El Monte	7	5
Fairchild @ Moffett	7	2
Castro @ Church	6	6
El Camino Real @ Castro	6	3
El Camino Real @ Distel Drive	6	3
Stierlin @ Terra Bella	6	2
Castro @ Dana	6	1
Rengstorff @ Rock	5	2
Rock @ Sierra Vista	5	2
Alma @ Bailey	5	1
Alviso @ Maude	5	1
Centre @ Highway 237	5	1
Castro @ Evelyn	5	0
Evelyn @ Whisman	5	0

(a) Involving five or more accidents

Chapter III

PRESENT TRAVEL PATTERNS

Current travel characteristics and patterns are discussed in this chapter. The analyses of related data and their projection to 1985 play a vital role in the development of major street and highway needs for the City of Mountain View.

The determination of the transportation relationship between Mountain View and its environs is perhaps the most significant part of this study. In this regard, two principal factors must be considered. First, its location within the peninsula urban area is important because regardless of activities occurring within the city, major traffic desire lines will cross its boundaries as a direct consequence of activities in adjacent areas. The second factor is related to the Mountain View community, the transportation requirements of its residents, and the traffic attraction of its commercial, industrial, institutional, and recreational facilities.

The community socio-economic life and its relationship to the entire urban complex directly affect the traffic generated by the various land uses. In order to gain an understanding of the transportation patterns within and near Mountain View, the current characteristics and magnitudes of various trip categories have been analyzed. Basic to this study and development of traffic projections for 1985 is the consideration of current travel patterns.

Traffic Characteristics and Study Area Definition

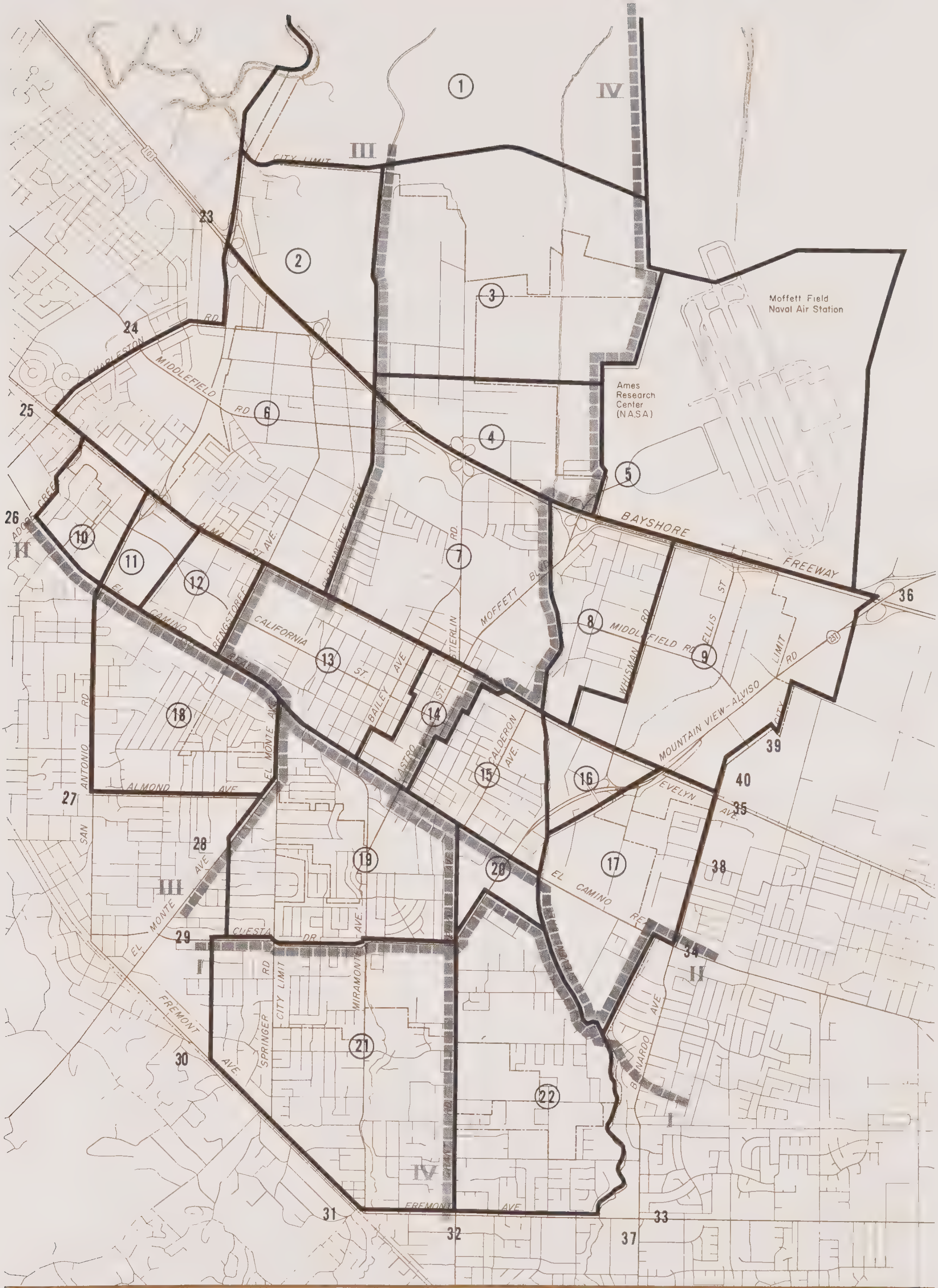
Motor vehicle traffic observed on Mountain View streets is composed of trips having many different origins, destinations, and purposes. It is

expedient to separate the traffic into various classifications to facilitate study and analysis.

Three categories may be used to describe the trips taking place within the study area:

> Internal trips being completely contained within the Mountain View study area.
>
> External trips having one trip end outside the study area and the other end within the study area. The external trips may be further separated into trips by local residents having destinations outside the study area and trips by non-residents who enter the Mountain View area for employment, shopping, business, or other purposes.
>
> Through trips having both origin and destination outside the study area.

To aid in analyzing these different types of trips, the study area was defined and divided into 22 traffic zones, as shown in Figure 9. The study area cordon or boundary line conforms generally to Fremont Avenue and San Antonio Road on the south and west, the Bay front on the north, and the east side of Moffett Field Naval Air Station, part of Bernardo Avenue and Stevens Creek on the east. Zones 1 through 5 are located north of Bayshore Freeway; Zones 6 through 16 are located between the Bayshore Freeway and El Camino Real; Zone 17 straddles El Camino Real; and Zones 18 through 22 are located south of El Camino Real. Zone 14 is the central Mountain View area or, in essence, the central business district. Zone 11 contains the San Antonio shopping center with the Sears and Rhodes department stores and other retail sales establishments. Zone 5 is the Moffett Naval Air Station. Zones 1, 2, and 3 are relatively undeveloped areas at the present time.



9

LEGEND

(15)	ZONE NUMBER
▬▬	ZONE BOUNDARY
27	EXTERNAL STATION
[▬▬] I	SCREEN LINE AND NUMBER

NORTH

0 1 2 3 4 5 6

MAP SCALE IN THOUSANDS OF FEET

MOUNTAIN VIEW
TRAFFIC CIRCULATION STUDY
Wilbur Smith and Associates

TRAFFIC STUDY ZONES, STATIONS, & SCREEN LINES

All study area access routes have been defined by 18 external stations, also shown on Figure 9. Stations 23 through 26 designate arteries crossing the western study area limit, stations 27 through 32 the southern access roadways, and 33 through 36 are on the Sunnyvale side of the cordon area. Stations 37 through 40 are additional access routes to be constructed prior to 1985 and will also be located on the Sunnyvale side.

Magnitude of Existing Travel

Traffic crossing the study area boundaries has been counted as part of regular area-wide traffic counts by the Mountain View Traffic Engineering Division as well as other area agencies, including the California Division of Highways. The total average daily through and external traffic crossing the cordon on major streets and highways in 1964 amounted to 360,000 vehicles. Internal motor vehicle trips, not readily determined by ground counts alone, are discussed later in this chapter.

Through Traffic - As previously mentioned, a significant part of the traffic entering the study area has no origin or destination within the Mountain View area and continues on to re-cross the boundary line. Because the amount of this through traffic is of importance in the study, special attention was directed to its evaluation. Field observations were made on December 9, 1964, when approximately 20 percent of all license plates were recorded as vehicles entered and left the study area at 16 major street cordon stations during two study periods, which included peak and off-peak traffic. Approximately 15,000 numbers were recorded and matched to determine the amount of through traffic between 7:40 A.M. and 9:40 A.M. as well as 11:00 A.M. and 2:00 P.M.

To determine the need for possible adjustment factors for any seasonal peaking effect of Christmas traffic, the Traffic Engineer of the City of Mountain View provided special volume counts on El Camino Real in the

central Mountain View area. No significant daily traffic peaking was recorded through December, 1964, and the volumes determined were approximately the same as the average daily traffic for 1964. The locations of major shopping centers in this area do not induce through traffic in Mountain View. Thus, no adjustment was required in treating the license plate sample.

Throughout the five-hour study period, there was no significant change in the percentage of through traffic at any cordon station. In every case, the hourly percentage variation from the weighted average percentage was less than seven percent.

The study disclosed that 23 percent of the traffic at the 16 cordon stations was through traffic. However, higher through traffic ratios (110 percent of the study results) were used in the traffic model to account for two basic conditions inherent to through traffic surveys and tending to show less than the true total through traffic. First, there are the inevitable errors in recording and transcription which are inherent in licence plate surveys. Second is the possibility that because the survey was conducted during the morning and midday, the 24-hour total through traffic may be higher due to greater numbers of through movements at other times of day, especially immediately after the close of the business day, when it could be anticipated that there would be fewer shopping trips, or social visits. Thus the through traffic was adjusted to approximately 25 percent of the traffic at the study station. However, the study stations did not include major streets which were expected to carry negligible or no through traffic -- Ellis Street and streets to the north of the Bayshore Freeway, particularly Moffet Boulevard. Therefore, the through traffic crossing the study area cordon, excluding the through traffic on the Bayshore Freeway, reduces to 23 percent through traffic.

The 1964 vehicle volume counts totaled 359,400 vehicle crossings of the study area cordon on major streets and highways. Of this total, motor vehicles which did not leave the Bayshore Freeway within the cordon accounted for 72,400 crossings (36,200 trips). The remaining 287,000 crossings were by motor vehicles utilizing arterial streets in the study area, of which through trips accounted for an additional 66,400 crossings, or 33,200 vehicles entering and leaving the area.

A summary of through traffic is presented in Table 11. This table contains the through traffic along the Bayshore Freeway as well, and indicates the overall through traffic to be approximately 39 percent. Figure 10 shows the combined movements of the through and external traffic by general direction.

<u>External Trips</u> - The total volume of external trips is 220,600. This number was determined by the subtraction of through traffic from the study area cordon crossings. Through trip cordon crossings, including through trips on the Bayshore Freeway, amount to 39 percent of all cordon crossings, and external trip crossings represent 61 percent.

<u>Internal Trips</u> - Internal traffic represents the difference between the total trip ends and the external trip ends in each traffic zone. To develop the magnitude of trip ends in each zone, land use has been analyzed and divided into four categories: residential, commercial, industrial, and public or quasi-public. The traffic generation of each land use has been estimated for each zone and the total trip ends determined for each of the 22 areas, based on trip generation indices obtained from studies of other comparable urban areas.

<u>Trip Generation</u>

A motor vehicle trip has two trip ends; one termed a production end and the other termed an attraction end. Generally, 75-85 percent of trips are

Table 11

EXTERNAL STATION TRAFFIC VOLUMES - 1964
Mountain View Traffic Circulation Study

STATION	TWO-WAY ADT	EXTERNAL VOLUME	THROUGH VOLUME	PERCENT THROUGH
23	80,000	36,000	44,000	55
24	14,000	9,800	4,200	30
25	19,000	15,600	3,400	18
26	37,200	26,900	10,400	28
27	16,500	11,700	4,700	28
28	5,200	4,700	500	10
29	4,300	3,700	600	14
30	15,000	8,100	6,900	46
31	3,500	2,300	1,200	34
32	18,700	11,500	7,200	38
33	13,000	9,200	3,800	29
34	32,000	24,000	8,000	25
35	11,000	8,800	2,200	20
36	90,000	48,300	41,700	46
Total	359,400	220,600	138,800	39

Note: This table includes through traffic on the Bayshore Freeway.

10

1964 DAILY TRAFFIC
APPROACHING & LEAVING STUDY AREA

MOUNTAIN VIEW
TRAFFIC CIRCULATION STUDY
Wilbur Smith and Associates

home-based (with one end at the home of the trip maker), and 15-25 percent are non home-based. A split of 80 percent home-based and 20 percent non home-based trips was estimated in the synthesis of current traffic desires. Home-based trips consist of the following purposes: work, shopping, social-recreation, school, and other. In this study, however, home-based trips are split into home-based work trips and home-based other trips, because work trip distribution information was available through a study conducted by the City Planning Department of Mountain View.

Land use data for 1964 in each traffic zone in the study area was supplied by the City Planning Department and is summarized in Appendix Tables A-1 and A-2.

Home-Based Work Trips - These trips are produced at homes and attracted to places of employment. From the study by the Planning Department, the following work trip generation factors were derived:

Dwelling Type	Work Trip Ends Per Dwelling Unit
Single Family	1.9
Two Family	2.0
Three or Four Family	2.0
Five or More Family	2.6
Trailer	1.2
Other	2.0

These factors were applied to the residential land use except in Zones 14 and 15, the zones of the old central core of Mountain View, where somewhat lower factors were used. This procedure produced 40,978 work trips (which includes an adjustment for trips to the Southern Pacific Railway terminal in Zone 14). Analysis of the Planning Department's study showed that 28,086 (68.5 percent) of these work trips were external and only 12,892 (31.5 percent) internal.

Motor vehicle work trips attracted in the study area were derived by dividing the number of employees in each zone by 1.2, a factor also derived from the Planning Department's study. This yielded 40,038 work trips attracted by Mountain View employment. As only 12,892 of these trips were previously determined to be made by Mountain View residents, it is concluded that the remaining 27,147 work trips attracted to the study area

are external. Thus, althouth the Mountain View study area contains a number of jobs approximating the available labor force, about 68 percent of the jobs are actually held by non-residents.

Home-Based Other Trips - Home-based other trips (non-work) are produced at home and attracted to shopping areas, recreational locations, schools, other residences, hospitals, and miscellaneous land uses. Trip production rates for this purpose vary according to the type of dwelling unit and increase as family income increases. Rates used for this purpose combined with residential trip production rates of the other purposes yield overall daily generation rates of about 10 motor vehicle trips per single family dwelling unit, and about 8 trips per unit in multiple-family dwellings. Home-based other trips produced by the study area were estimated at 67,762 trips, of which 41,893 (62 percent) are estimated to be external and 25,869 (38 percent) internal.

Trip generation indices derived from studies in comparable urban areas were applied to the current land uses to determine the home-based other trips attracted in the study area. These totaled 105,220 trips, of which 25,869 are produced in the study area, as determined previously, and 79,351 are external.

Non Home-Based Trips - Non home-based trip generation is estimated to be 0.7 trips per person in the study area. A person, in this instance, relates to a resident living or an employee working in the study area. The total persons are 78,534 (resident population of 57,708 and 20,826 employees) yielding non home-based trips of approximately 55,000. External trips were estimated at 44,120 (20 percent of 220,600 external trips) and the remainder were internal.

A summary of internal and external trips for the above purposes is presented in Table 12.

Zone 5 generation is not readily synthesized because of the unique combination of the Ames Research Center and Moffett Field (United States Naval Air Station). However, traffic counts supplied by Naval officials on the limited access routes to this study zone eliminated the need for synthesis.

Table 12

VEHICLE TRIP SUMMARY - 1964
Mountain View Traffic Circulation Study

TRIP PURPOSE	TYPE OF TRIP	TRIP ENDS: Productions		TRIP ENDS: Attractions	TRIPS: Internal	TRIPS: External	TRIPS: Total
Home-Based Work	Internal	40,978	12,892	40,038	12,892		
	External	27,146		28,086		55,232	68,124
Home-Based Other	Internal	67,762	25,869	105,220	25,869		
	External	79,351		41,893		121,244	147,113
Non Home-Based	Internal	33,022	10,962	33,022	10,962		
	External	22,060		22,060		44,120	55,082
Total					49,723	220,596	270,319

Trip Distribution

Analyses of origin-destination data from a large number of traffic studies have indicated that a consistent relationship exists between travel patterns and land use. These relationships may be used to develop a mathematical model to simulate traffic desires for any year for which the necessary land use data are available. The development of the trip distribution model is described here briefly.

In essence, the distribution model states that the number of trips between each pair of zones will be directly related to the opportunities for trips to originate and terminate within the zones and inversely related to the resistance to the movement, or the "friction" of time necessary to make the trip. (This is similar to the gravity principle expressed in Newton's Law.) To utilize the model, three elements of data are employed for each trip purpose: (1) the number of trip ends produced in each zone, (2) the number of trip ends attracted in each zone, and (3) an attraction factor which is based on travel time between zones. The trip distribution model or equation may be stated as follows:

$$T_{i-j} = P_i \frac{A_j \quad F_{i-j}}{\sum_{j=1}^{n} A_j \quad F_{i-j}}$$

where:

T_{i-j} = Trips produced in zones i and attracted to zone j

P_i = Total trips produced by zone i

A_j = Total trips attracted to zone j

F_{i-j} = Attraction factor for the respective trip purpose, related to travel time between zones i and j

$\sum_{j=1}^{n}$ = Summation over all n zones.

In applying the equation, interchanges are calculated between all possible zonal combinations for each of the trip purpose categories. The relative totals are summed and balanced to the predetermined control totals of each origin zone and each destination zone through a series of iterations until the total interzonal movements related to the zones are within ten percent of the control totals. This process requires a large number of calculations, so the model was programmed for the use of currently available high-speed electronic digital computers. In this study a CDC 1604-A was utilized.

Zonal trip productions and attractions were synthesized as previously mentioned, and interzonal off-peak travel times estimated from results of field speed studies. These minimum travel times were applied to a basic link-node network coded for computer use.

Trip attraction factors (F in the preceding equation) shown in Figure 11, representing the effect of distance upon the attraction of competing destinations for trips, are based on the Los Angeles Regional Transportation Study (LARTS), in the absence of locally derived curves. The curve for the home-based work purpose was applied directly, whereas the curves for the other two purposes were adjusted to yield shorter average travel times which are expected in Mountain View where travel patterns are more localized.

Results of the 1964 synthetic O-D distribution are listed in Table 13 and schematically represented by trip desire lines in Figures 12 and 13. Figure 12 illustrates internal travel; Figure 13, external and through travel. (Through traffic on the Bayshore Freeway, between Stations 23 and 36, is omitted from these results.)

Accuracy Test

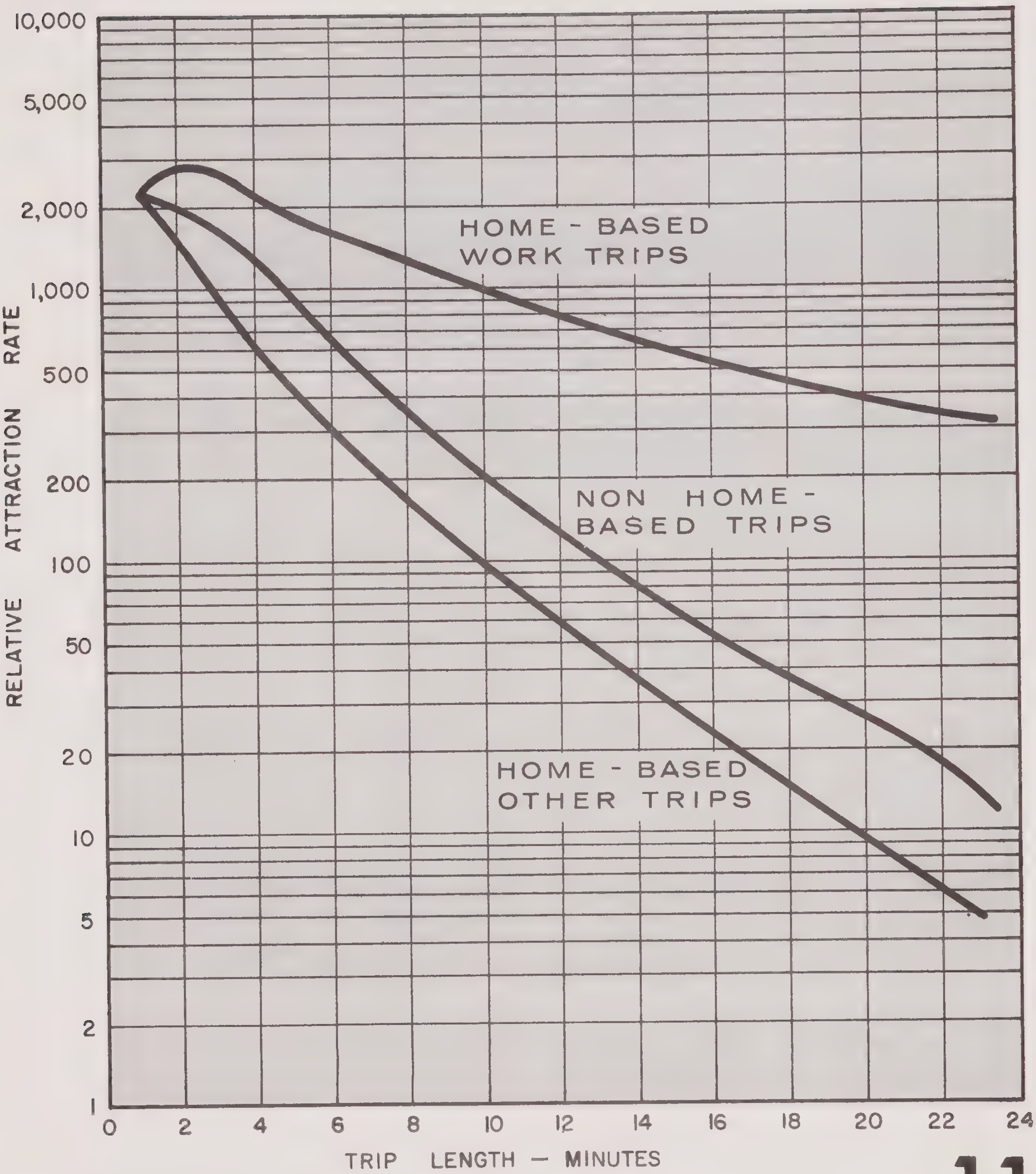
To verify the accuracy of the model for trip distribution applications, comparisons were made of daily motor vehicle traffic volumes counted crossing

Table 13

MOTOR VEHICLE TRAVEL DESIRES - 1964
Mountain View Traffic Circulation Study

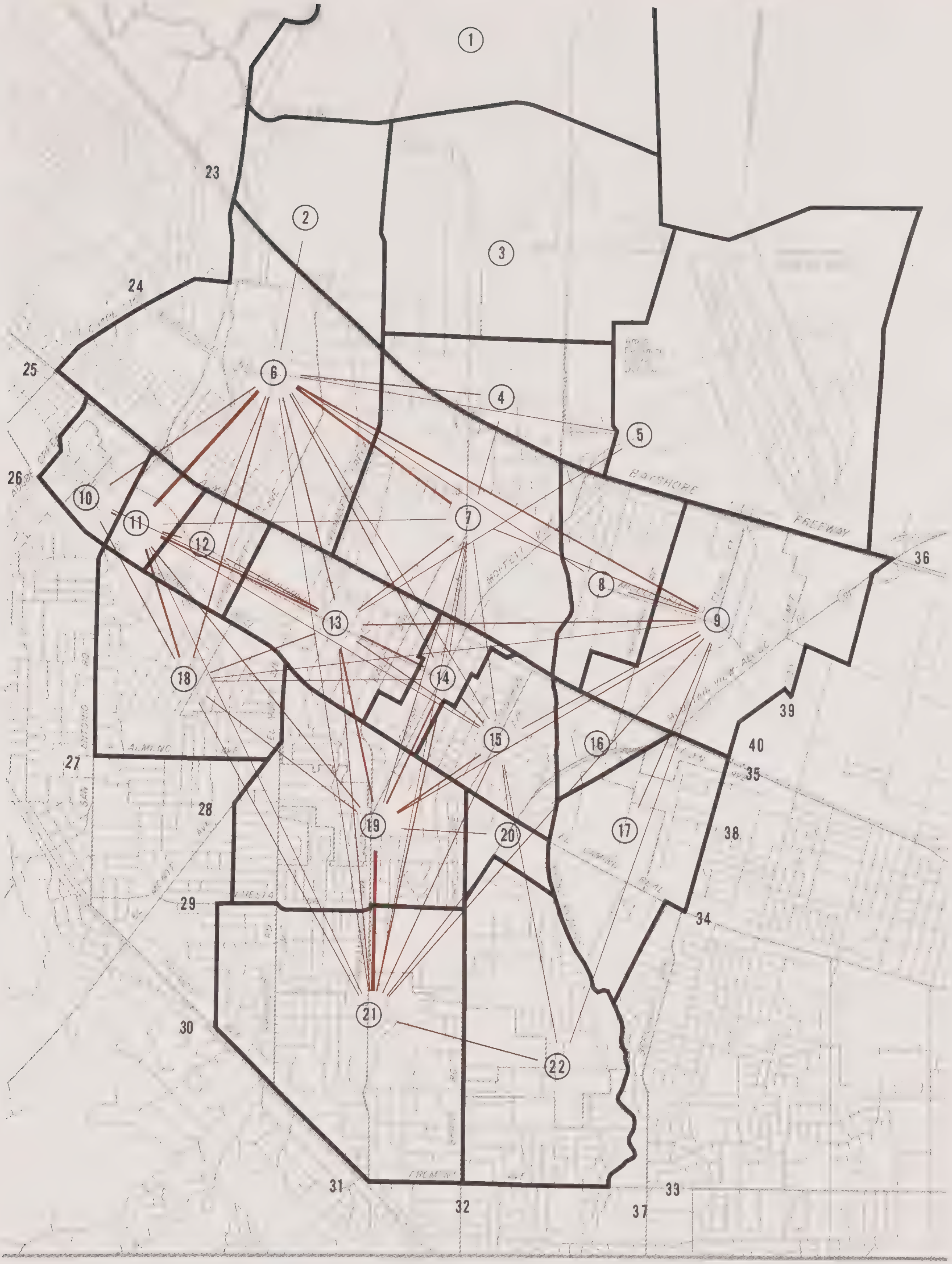
INTERNAL ZONE	INTERNAL ZONE 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	INTERNAL TRIP ENDS
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2		7	13	27	19	269	83	36	29	25	37	14	51	20	32	2	9	27	35	7	22	9	780
3			11	26	19	117	66	23	41	15	30	9	41	23	22	2	4	16	25	7	17	6	544
4				43	67	425	312	91	126	38	79	23	134	76	83	9	19	41	114	21	66	20	1,883
5					16	359	176	156	64	70	57	54	233	54	107	5	56	78	159	33	103	57	1,958
6						2,341	1,033	342	874	733	1,535	361	679	388	364	56	87	636	416	122	292	100	13,870
7							406	176	488	123	263	107	645	353	343	34	51	151	360	75	213	55	5,919
8								184	490	43	131	27	124	190	159	52	52	45	107	104	117	38	2,871
9									112	185	79	153	641	104	391	32	301	217	512	187	434	282	5,854
10										321	876	176	333	119	90	14	14	439	173	31	120	38	4,297
11											524	515	797	194	281	8	35	949	509	59	294	98	7,874
12												79	420	143	85	12	12	186	126	22	87	21	2,711
13													921	829	519	63	52	523	720	130	443	94	9,313
14														169	586	25	72	207	858	125	448	133	5,285
15															525	58	81	163	725	259	392	113	5,903
16																2	31	22	63	30	51	29	602
17																	32	26	81	71	84	34	1,236
18																		1,029	417	70	336	86	6,693
19																			1,083	358	1,563	273	9,760
20																				83	369	156	2,402
21																					1,026	553	8,056
22																						259	2,713
EXTERNAL STATION																							
23																							
24																							
25																							
26																							
27																							
28																							
29																							
30																							
31																							
32																							
33																							
34																							
35																							
36																							
TOTALS																							100,524

EXTERNAL STATION														EXTERNAL	THROUGH	TOTAL
23	24	25	26	27	28	29	30	31	32	33	34	35	36	TRIP ENDS	TRIP ENDS	TRIP ENDS
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0
779	133	159	0	88	0	0	0	8	45	45	173	73	699	2,202	-	2,982
352	67	96	0	51	0	15	0	6	32	28	120	49	520	1,336	-	1,880
1,244	204	281	320	147	0	48	0	21	114	111	403	179	1,869	4,941	-	6,824
1,068	478	330	173	0	45	133	0	58	91	0	502	115	1,251	4,244	-	6,202
7,484	2,334	3,146	3,638	2,072	0	0	0	119	486	440	1,949	750	8,025	30,443	-	44,313
2,976	505	655	841	0	280	186	0	68	309	273	960	650	4,253	11,956	-	17,875
1,504	211	404	499	0	97	105	0	40	249	0	957	736	2,972	7,774	-	10,645
2,812	1,371	913	405	0	125	624	0	240	427	0	2,149	540	4,292	13,898	-	19,752
1,534	481	1,054	3,795	1,247	0	0	0	49	235	205	594	175	1,338	10,707	-	15,004
3,464	1,024	2,155	4,972	3,562	0	0	0	103	592	559	1,359	470	3,002	21,262	-	29,136
1,001	281	588	1,139	549	0	0	0	36	127	129	383	143	634	5,010	-	7,721
2,497	595	1,399	2,595	0	964	0	0	131	593	595	1,510	644	2,855	14,378	-	23,691
1,293	423	550	641	0	331	347	0	143	472	421	1,317	514	1,909	8,361	-	13,646
1,365	232	612	840	0	306	218	0	95	630	567	2,069	934	2,758	10,626	-	16,529
193	86	74	46	0	19	60	0	22	66	0	316	117	427	1,426	-	2,028
420	67	147	211	0	60	66	0	26	188	0	1,028	315	1,161	3,689	-	4 925
1,899	518	1,203	2,955	4,031	1,449	0	0	119	624	569	1,071	249	1,356	16,043	-	22 736
1,747	289	850	1,787	0	984	786	0	277	1,548	1,130	2,221	700	2,842	15,161	-	24,921
482	100	160	326	0	0	191	0	80	695	537	1,486	580	2,210	6,847	-	9,249
1,286	279	606	1,204	0	0	758	6,778	526	2,638	1,731	2,275	533	2,472	21,086	-	29,142
512	90	221	452	0	0	158	1,263	131	1,328	1,827	1,061	262	1,340	8,645	-	11,358
-	500	184	705	866	26	0	18	14	469	211	899	726	0	35,912	4,618	40,530
	-	0	0	400	0	0	0	50	200	100	700	150	2,100	9,768	4,200	13,968
		-	0	427	0	0	0	56	259	129	540	893	987	15,603	3,475	19,078
			-	1,759	0	0	0	32	972	407	4,806	321	1,532	26,839	10,534	37,373
				-	0	0	0	0	0	0	302	63	879	11,747	4,696	16,443
					-	0	0	0	0	0	105	0	411	4,660	542	5,202
						-	0	24	74	44	148	18	298	3,695	606	4,301
							-	244	3,464	2,328	378	70	598	8,041	7,100	15,141
								-	162	235	8	6	306	2,298	1,137	3,435
									-	242	0	0	1,462	11,489	7,304	18,793
										-	0	0	0	9,167	3,696	12,863
											-	0	0	23,903	7,886	31,789
												-	0	8,728	2,247	10,975
													-	48,185	8,573	56,758
														440,070	66,614	607,208



ATTRACTION FACTORS
AUTO DRIVER TRIPS

11



LEGEND

(15)	ZONE NUMBER
▬	ZONE BOUNDARY
27	EXTERNAL STATION

TRAFFIC SCALE

15,000 10,000 5,000 2,500 500

VEHICLE TRIPS PER DAY
TRIPS UNDER 200 NOT SHOWN

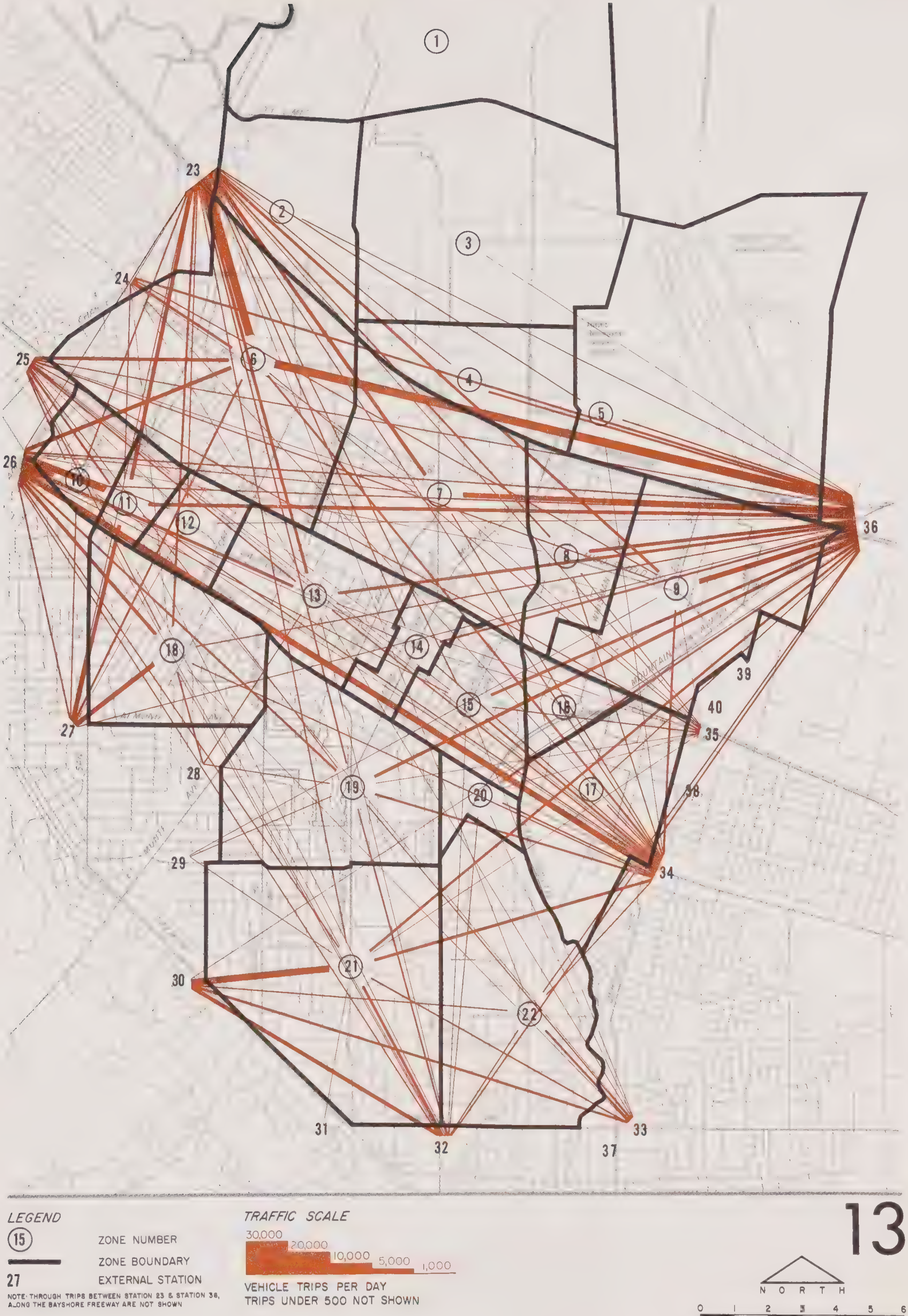
12

NORTH

0 1 2 3 4 5 6
MAP SCALE IN THOUSANDS OF FEET

MOUNTAIN VIEW
TRAFFIC CIRCULATION STUDY
Wilbur Smith and Associates

1964 INTERNAL TRAVEL DESIRES



1964 TRAVEL DESIRES EXTERNAL & THROUGH TRIPS

MOUNTAIN VIEW
TRAFFIC CIRCULATION STUDY
Wilbur Smith and Associates

four screen lines in the study area, comparing theoretical crossings from the synthesized O-D data and actual ground counts. These comparisons are listed below in Table 14. The screen lines are shown in Figure 9.

Table 14

SCREEN LINE COMPARISONS - SYNTHETIC O-D VS. GROUND COUNTS

SCREENLINE	GROUND COUNTS	SYNTHESIZED TRIPS	RATIO
I-I	42,500	43,447	1.02
II-II	78,000	84,312	1.08
III-III	117,000	105,126	0.90
IV-IV	129,000	126,812	0.98

The screen line checks indicate close agreement between synthetic and actual trip volumes, and support the validity of the model for estimation of future trips.

To further check the coded major street network and the synthesized 1964 O-D distribution, a computer program developed by Wilbur Smith and Associates, utilizing the California freeway/arterial street diversion curve, was employed to assign the 1964 origin-destination matrix to the arterial network. Although some individual street volumes varied from ground counts, corridor assignments were consistent with actual corridor volumes - a further verification of the model.

1964 Transit

Public mass transit service available to Mountain View residents consists of scheduled inter-city service to and from San Francisco and San Jose by the Southern Pacific Railroad and Greyhound Bus Lines. No local public transit exists in Mountain View other than taxi service.

The Greyhound Bus service operates basically with half-hour headways between 7:00 A.M. and 7:00 P.M. with additional service during morning and afternoon peak hours.

Monday through Friday, northbound Southern Pacific commuter trains stop in Mountain View 21 times between 5:20 A.M. and 10:15 P.M.; southbound trains, 21 times between 7:12 A.M. and 1:30 A.M. This service is essentially oriented to the commuters to and from San Francisco, although a significant number of students from San Jose and Santa Clara also ride the trains daily. Weekend schedules are somewhat abbreviated.

Chapter IV

FUTURE TRAVEL

The planning of a system of major streets to satisfy future traffic demands in an urban area requires a series of careful analyses of the factors which combine to produce these demands. The projection processes and the data used in thses analyses are described and discussed in this chapter.

Also considered here is the possible role of public transit in the Mountain View area.

1985 Land Use

Preliminary 1985 land use for each of the 22 zones in the study area was projected by the Mountain View City Planning Department and as described in Chapter III, provided the basis for future motor vehicle trip generation estimates for each of these zones. By 1985 virtually all the orchard lands will have been converted to residential use to house the increased population projected for that year. Increased residential development along with industrial expansion will occupy the area between the Central Expressway and the Bayshore Freeway. North of the Bayshore Freeway, in the area currently supporting very low density development, varied land use including a bayfront park is proposed. These projections assume that a relatively small percentage of the bay front lands will be developed by 1985. Detailed tabulations of the Planning Department's preliminary land use projections are presented in Appendix Tables A-3 and A-4.

Growth Factors

Growth factors for external trips have been based on population and employment projections by several agencies. These projections for 1985, together with 1964 population and employment data, are listed in Table 15 for selected exterior zones. These exterior zones are depicted in Figure 14 and constitute convenient groupings of census tracts in San Francisco, San Mateo, and Santa Clara Counties. Lacking more precise data, total employment information only was used for San Mateo and Santa Clara Counties. No employment projections for San Francisco were available.

External traffic was estimated by using the average growth factor method to expand cordon station traffic. The growth factor for each station is a composite of the factors for the various exterior zones contributing traffic to that station averaged with the growth factor for the Mountain View study area. For example, the growth factors for external work trips produced in Mountain View is the average of the growth factor of the study area population and the composite employment growth factor for employment of exterior zones contributing to each station. The growth factors for external work trips attracted to Mountain View are derived conversely. Because of the decreased rate of attraction associated with longer trips, the growth rates of exterior zones closer to the study area were given more weight than those of more distant zones. Total external station growth was derived using growth factors equal to the ratio of the zonal totals of population and employment for 1985 related to 1964.

Future Trip Generation

External traffic for 1985 was predicted as described above and is presented in Table 16. Adjustments have been made commensurate with anticipated additions to the major street and highway network of Mountain View and its environs. Trips to and from Station 23, for example, have been reduced because the Junipero Serra Freeway is expected to divert traffic from the Bayshore Freeway. In the traffic model, these external trips were diverted

Table 15

POPULATION AND EMPLOYMENT - 1964 and 1985
Mountain View Traffic Circulation Study

ZONE	POPULATION 1964	POPULATION 1985	EMPLOYMENT 1964	EMPLOYMENT 1985
101	755,700	752,000	482,200	Not Available
102	254,600	382,600	94,400	153,000
103	157,500	242,000	58,300	96,900
104	96,600	170,400	35,800	68,200
105	22,600	28,100	28,200	67,700
106	45,200	56,300	17,600	42,200
107	25,500	27,900	3,900	9,400
108	300	2,400	3,100	7,400
109	19,700	80,000	20,800	50,000
110	78,100	122,400	25,000	60,000
111	51,600	68,500	20,200	47,500
112	100,500	173,400	9,800	20,500
113	295,300	678,900	129,000	310,000

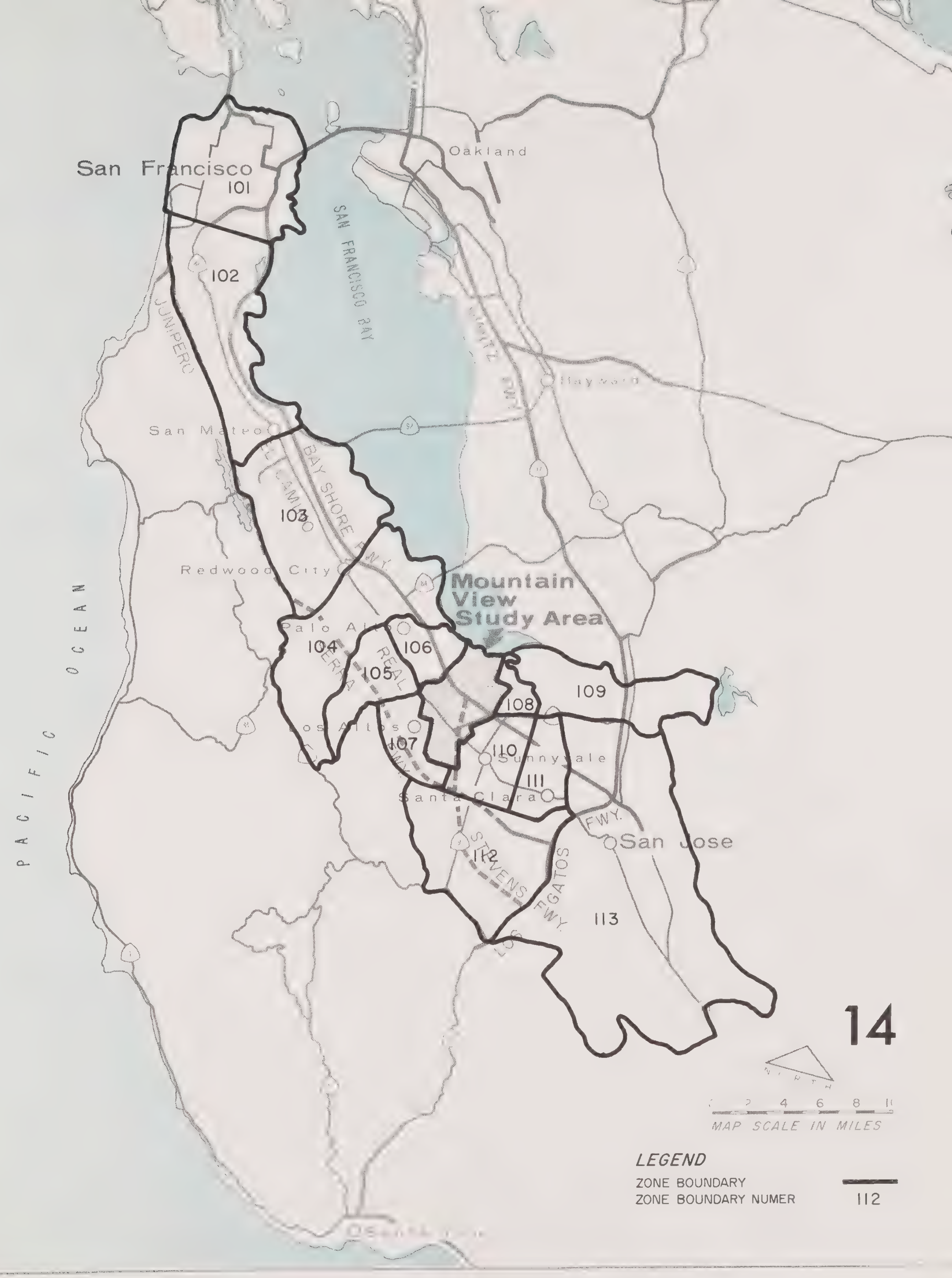
Source: Population totals by census tracts supplied by Santa Clara County, San Mateo County, and San Francisco Planning Departments. Employment estimates by Wilbur Smith and Associates from data contributed by the same agencies.

Table 16

EXTERNAL STATION TRAFFIC VOLUMES - 1985
Mountain View Traffic Circulation Study

EXTERNAL STATION	1964 EXTERNAL TRIPS	GROWTH FACTOR	1985 EXTERNAL TRIPS Predicted	Adjusted
23	36,000	1.84	66,000	48,000
24	9,800	1.82	18,000	18,000
25	15,600	1.90	30,000	30,000
26	26,900	1.90	51,000	51,000
27	11,800	1.68	20,000	24,000
28	4,700	1.68	8,000	16,000
29	3,700	1.68	6,000	8,000
30	8,100	1.68	14,000	18,000
31	2,300	1.68	4,000	4,000
32	11,500	1.68	19,000	13,000
33	9,200	2.12	20,000	13,000
34	23,900	2.12	51,000	22,000
35	8,800	2.12	19,000	13,000
36	48,300	2.15	104,000	79,000
37	-	-	-	31,000
38	-	-	-	13,000
39	-	-	-	13,000
40	-	-	-	16,000
Total	220,600		430,000	430,000

Note: Through trips not included in this table.



EXTERIOR ZONES

MOUNTAIN VIEW
TRAFFIC CIRCULATION STUDY
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to Stations 27, 28, 29, and 30, basically connecting to an El Monte Avenue interchange with the Junipero Serra Freeway.

The major network changes affecting external trips are along the eastern and southeastern boundaries of the study area. Middlefield Road (Station 39), the Central Expressway (Station 40), Dana Street (Station 38), and Stevens Freeway (Station 37) have been added to the network. External traffic volumes over these boundaries (Stations 32-36 inclusive in 1964) were projected to 1985 and are also shown in Table 16. The 1985 total was 213,000, which has been distributed over Stations 32-40 in proportion to their respective capacities. Traffic on the new Foothill Expressway (part of the Santa Clara County expressway network) paralleling Fremont Avenue on the southerly boundary of the study area has been combined with Fremont Avenue traffic in one corridor movement from Station 33.

Trip generation within the study area for 1985 was derived by applying the 1964 generation factors to the 1985 land use estimates. Residential motor vehicle trip generation was increased by an overall 20 percent to account for increasing automobile ownership and rising income which will stimulate automobile usage. However, work trip generation was not increased as it has been found not to vary significantly with changes in automobile ownership or income level.

Projected through trips were determined by expanding existing through trips by growth indices discussed previously and vary according to estimated locations of trip origins and destinations. New trafficways will ease the through traffic burden on Mountain View streets. Traffic from the southeast destined to the Bayshore Freeway will be diverted from surface streets to the Stevens Freeway. East-west traffic now using El Camino Real as a through route will be diverted to the Central Expressway and to the Junipero Serra Freeway, permitting El Camino Real to serve as a local business and

collector street in Mountain View. Also, a portion of Los Altos and Los Altos Hills traffic now crossing Mountain View to use the Bayshore Freeway will be diverted to the Junipero Serra Freeway.

A summary of internal and external trips for 1985 is presented in Table 17. A summary comparison of 1964 and 1985 trips is shown in Table 18.

Future Trip Distribution

The same method described in the discussion of 1964 trip distribution synthesis was used in estimating 1985 motor vehicle travel patterns. Trip attraction factors for each purpose in the base year, 1964, are assumed to be applicable in 1985. In the determination of interzonal travel times, network link speeds were selected commensurate with desirable running speeds for each type of route.

Table 19 lists the estimated motor vehicle trip distribution for 1985. The consequent travel desires are illustrated schematically in Figures 15 and 16. Figure 15 depicts internal travel; Figure 16, external and through travel. In this analysis, the through traffic on the Bayshore Freeway, Stevens Freeway, and the Foothill Expressway has been excluded. Also, as noted above, the Foothill Expressway has been incorporated into a Fremont Avenue corridor to facilitate analysis of Mountain View oriented traffic.

Role of Transit

Included in this section is a discussion of transit services in the Mountain View area as they relate to problems of mobility and accessibility. The objective here is not to develop a detailed operational transit service plan, but to consider the likely role of public transit in the overall transportation plan.

Table 17

VEHICLE TRIP SUMMARY - 1985
Mountain View Traffic Circulation Study

TRIP PURPOSE	TYPE OF TRIP	TRIP ENDS: Productions		TRIP ENDS: Attractions	TRIPS: Internal	TRIPS: External	TRIPS: Total
Home-Based Work	Internal	100,766	37,651	69,036	37,651		
	External	31,385		63,115		94,500	
							132,151
Home-Based Other	Internal	160,978	96,908	282,338	96,908		
	External	185,430		64,070		249,500	
							346,408
Non Home-Based	Internal	71,239	28,239	71,239	28,239		
	External	43,000		43,000		86,000	
							114,239
Total					162,798	430,000	592,798

Table 18

SUMMARY OF AVERAGE DAILY MOTOR VEHICLE TRIPS
CLASSIFIED BY ORIGIN AND DESTINATION CLASS
1964 and 1985
Mountain View Traffic Circulation Study

TRIP CLASS	1964 Number	1964 Percent	1985 Number	1985 Percent	RATIO 1985/1964
Internal					
Interzonal	40,550	15.0	134,108	22.6	3.3
Intrazonal	9,173	3.4	28,690	4.8	3.1
Total Internal	49,723	18.4	162,798	27.4	3.3
External	220,596	81.6	430,000	72.6	1.9
Grand Total	270,319	100.0	592,798	100.0	2.2

Table 19

MOTOR VEHICLE TRAVEL DESIRES - 1985
Mountain View Traffic Circulation Study

INTERNAL ZONE	INTERNAL ZONE 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	INTERNAL TRIP ENDS
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2		128	666	186	105	1,235	473	282	166	107	242	114	249	83	117	23	161	95	119	92	123	93	4,987
3			1,276	410	360	2,255	1,647	561	685	231	619	205	539	282	300	78	307	184	300	225	304	192	12,902
4				198	268	1,467	1,388	609	431	127	301	128	412	205	277	58	247	108	239	147	198	177	7,779
5					40	1,261	1,068	733	127	222	123	215	698	136	252	43	534	142	292	157	227	189	7,232
6						6,773	4,392	1,865	2,402	1,784	3,494	1,182	2,402	895	930	246	1,134	1,239	1,044	723	881	615	44,992
7							2,287	1,872	2,536	425	1,385	516	2,263	1,073	823	246	839	549	1,373	702	1,131	512	29,787
8								707	1,479	178	656	211	614	673	641	200	574	187	457	574	657	363	14,800
9									180	470	138	526	1,722	286	579	124	1,788	345	814	393	641	519	16,531
10										835	2,557	519	737	200	164	53	144	781	285	88	269	102	11,113
11											870	1,441	2,041	303	427	40	418	1,712	848	154	581	276	19,496
12												312	1,382	299	210	61	180	497	328	95	290	104	9,127
13													2,327	1,504	1,150	261	674	1,352	1,912	368	1,129	372	26,435
14														225	664	501	666	283	1,107	233	741	251	10,835
15															607	156	665	252	992	512	747	478	11,550
16																14	322	53	159	102	146	106	3,006
17																	2,946	218	583	618	800	564	17,328
18																		1,577	593	195	836	264	13,039
19																			1,851	813	3,644	844	20,448
20																				294	1,114	656	8,549
21																					3,418	2,549	23,844
22																						1,825	12,876
EXTERNAL STATION																							
23																							
24																							
25																							
26																							
27																							
28																							
29																							
30																							
31																							
32																							
33																							
34																							
35																							
36																							
37																							
38																							
39																							
40																							
TOTALS																							326,656

								EXTERNAL STATION										EXTERNAL	THROUGH	TOTAL
23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	TRIP ENDS	TRIP ENDS	TRIP ENDS
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
1,545	447	580	0	374	0	0	0	33	146	235	314	211	1,772	641	186	207	254	6,945		11,932
2,582	671	1,044	0	663	0	192	0	71	294	492	746	412	3,863	1,514	348	455	607	13,954		26,856
1,699	457	639	794	422	0	149	0	59	247	420	578	363	2,981	1,272	306	430	418	11,234		19,013
1,409	769	490	290	0	169	248	0	111	161	0	339	190	1,559	633	165	209	234	6,976		14,208
9,515	4,173	5,681	7,338	4,522	0	0	0	255	1,058	1,681	2,647	1,526	12,103	4,667	1,269	1,426	1,868	59,729		104,721
5,239	1,483	2,225	2,811	0	2,002	665	0	205	706	1,225	1,697	1,125	8,341	3,690	943	1,271	1,478	35,106		64,893
2,604	677	1,153	1,350	0	834	385	0	140	508	0	1,174	954	6,249	2,679	780	1,313	1,075	21,875		36,675
2,985	1,680	1,036	508	0	403	701	0	311	419	0	767	600	4,484	1,323	597	894	822	17,530		34,061
1,624	764	1,708	6,656	2,685	0	0	0	82	177	304	417	266	1,603	798	234	214	342	17,874		28,987
3,447	1,746	3,955	10,362	6,813	0	0	0	145	426	818	1,137	740	4,380	2,241	646	662	1,080	38,598		58,094
1,478	623	1,309	2,752	1,571	0	0	0	80	181	302	437	299	1,363	810	256	268	408	12,137		21,264
3,091	989	2,459	4,529	0	4,134	0	0	220	568	813	1,393	801	3,992	2,283	857	761	1,024	27,914		54,349
986	409	720	891	0	824	425	0	133	356	529	671	515	2,303	1,453	555	492	582	11,844		22,679
1,161	325	727	881	0	783	402	0	96	518	690	967	799	2,950	2,234	856	590	894	14,873		26,423
362	147	178	153	0	131	108	0	42	108	0	233	206	901	526	222	190	225	3,732		6,738
2,139	531	1,249	1,487	0	1,014	492	0	201	933	0	2,390	1,148	5,611	4,230	1,602	955	1,337	25,319		42,647
1,448	641	1,486	4,065	6,943	3,247	0	0	164	438	379	522	273	1,327	0	294	248	401	21,876		34,915
1,453	453	1,215	2,325	0	2,458	1,285	0	328	961	831	1,170	677	3,305	0	726	589	770	18,546		38,994
876	265	512	720	0	0	528	0	137	723	775	1,318	643	3,841	0	742	621	726	12,427		20,976
1,437	482	1,044	2,140	0	0	1,945	14,488	898	2,521	1,561	1,753	776	3,722	0	906	741	900	35,314		59,158
911	259	583	933	0	0	474	3,503	290	1,542	1,941	1,326	476	2,330	0	510	461	553	16,092		28,968
-	800	400	1,000	600	0	0	0	0	0	0	1,600	0	0	0	0	0	600	47,991	5,000	52,991
	-	0	0	600	0	0	0	200	0	0	800	0	2,400	400	0	0	600	17,991	5,800	23,791
		-	0	1,600	0	0	0	200	600	200	2,800	0	2,000	600	0	0	7,000	29,993	15,400	45,393
			-	1,600	0	0	0	0	200	200	1,400	0	2,000	1,200	0	0	1,200	50,985	8,800	59,785
				-	0	0	0	0	0	0	400	0	1,600	0	0	0	200	23,993	6,600	30,593
					-	0	0	0	0	0	200	0	400	0	0	0	200	15,999	800	16,799
						-	0	0	0	0	200	0	600	0	0	0	200	7,999	1,000	8,999
							-	400	1,000	800	400	0	1,000	0	0	0	400	17,991	4,000	21,991
								-	200	400	0	0	0	0	0	0	0	4,001	1,400	5,401
									-	400	0	0	0	0	0	0	0	12,991	2,400	15,391
										-	0	0	0	0	0	0	0	12,996	2,000	14,996
											-	0	0	0	0	0	0	21,996	7,800	29,796
												-	0	0	0	0	0	13,000	0	13,000
													-	2,800	0	0	0	78,980	12,800	91,780
														-	0	0	0	30,994	5,000	35,994
															-	0	0	13,000	0	13,000
																-	0	12,997	0	12,997
																	-	15,998	10,400	26,398
																		859,790	89,200	1,275,646

LEGEND

(15)	ZONE NUMBER
▬	ZONE BOUNDARY
27	EXTERNAL STATION

TRAFFIC SCALE

15,000 10,000 5,000 2,500 500

VEHICLE TRIPS PER DAY
TRIPS UNDER 200 NOT SHOWN

15

NORTH

0 1 2 3 4 5 6

MAP SCALE IN THOUSANDS OF FEET

MOUNTAIN VIEW
TRAFFIC CIRCULATION STUDY
Wilbur Smith and Associates

1985 INTERNAL TRAVEL DESIRES

LEGEND

(15) ZONE NUMBER

ZONE BOUNDARY

27 EXTERNAL STATION

NOTE: THROUGH TRIPS ON THE FREEWAYS BETWEEN STATION 23 AND STATION 36 AND BETWEEN STATION 23 AND STATION 37 ARE NOT SHOWN.

TRAFFIC SCALE

30,000 20,000 10,000 5,000 1,000

VEHICLE TRIPS PER DAY

TRIPS UNDER 500 NOT SHOWN

16

NORTH

0 1 2 3 4 5 6

MAP SCALE IN THOUSANDS OF FEET

MOUNTAIN VIEW
TRAFFIC CIRCULATION STUDY
Wilbur Smith and Associates

1985 TRAVEL DESIRES EXTERNAL & THROUGH TRIPS

As indicated in the preceding chapter, public mass transit in Mountain View currently consists of railroad and bus service oriented essentially to interurban and commuter trips to San Jose and San Francisco, and points between. The bulk of commuting to San Francisco for work is handled by the Southern Pacific trains which stop a total of 10 times between 6:30 A.M. and 8:30 A.M., Monday through Friday. The service provided is, in essence, rapid transit.[1] Two of these stops are made at the so-called Castro station, located at Rengstorff and Crisanto Avenues; the principal station stop being located on Evelyn Avenue at View Street, on the north side of the Mountain View CBD. A parking lot with several hundred spaces is available, for a daily fee of 25 cents, to commuters boarding at the Evelyn Avenue site. No public off-street parking is provided for commuters at the Castro stop.

A recent survey by the Mountain View Police Department[2] ascertained that 111 autos were parked in the fee lot and observed that 144 other autos were parked in nearby locations known to the police to be used by commuters. The Chief of Police also estimated that possibly 50 more commuter vehicles were parked in other nearby areas used in common with local employees. Thus, the total number of autos parked for rail commute purposes amounted to about 300. By checking license numbers, the home addresses of the 255 parked in the commuter facilities were determined as summarized below in Table 20.

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[1] Usually defined as a facility operating on exclusive right-of-way permitting high speed and scheduled operation unaffected by general traffic.

[2] Memorandum from Chief of Police to City Manager, February 27, 1964.

Table 20

RAIL COMMUTER ORIGINS
Southern Pacific - Mountain View Station
February 11, 1964

LOCATION	NUMBER	PERCENTAGE
Los Altos	95	37.2
Mountain View	89	34.9
Sunnyvale	38	14.9
Cupertino	6	2.4
San Jose	5	2.0
Palo Alto	2	0.8
Other	20	7.8
Total	255	100.0

Mountain View registrations constituted more than one-third of the commute parker groups; somewhat less than those from Los Altos. Sunnyvale commuters, the next largest group, accounted for less than 15 percent. According to information from the Southern Pacific Company, approximately 783 San Francisco commuters currently board trains in Mountain View for the hour-long trip to San Francisco. All but 47 of these utilize the main station near the CBD.

An average of 115 passengers commute between Santa Clara and San Jose stations and the main Mountain View station. Student passengers, afforded a fare discount of approximately 50 percent, comprise the greatest part of this group and transfer from the train to local parochial school buses at the main station.

The Greyhound buses travel through Mountain View on two routes; Evelyn-Alma and Evelyn-Bailey-El Camino, serving intercity personal transport needs. Due in great part to the fact that the buses make curb stops through-

out the city, specific patronage estimates for Mountain View bus riders were unobtainable. Normal scheduled bus travel time to San Francisco is approximately 1 hour and 20 minutes. However, one northbound bus at 9:30 A.M. and two southbound buses at 4:30 P.M. and 5:15 P.M. are scheduled for express service of 40 minutes on the San Francisco run.

The 1960 U.S. Census of Population and Housing published by the Federal Bureau of the Census includes certain statistical data relating to the means of transportation utilized for trips to places of work. The total number of workers listed for that year in Mountain View was 12,382, of which 706 or 5.7 percent utilized bus or rail transport, which could only be Greyhound or Southern Pacific. It is clearly evident on the basis of the number of parked vehicles observed that many of these passengers were members of car pools or drove their own autos to the terminal locations for transfer to the transit vehicles. Some number could have walked directly to the bus or train. However, the largest single area from which passengers arrive is Los Altos; therefore, the auto trips were assuredly an important link in these particular work journeys, reported in the census as being basically by rail or bus.

By way of comparison, 736 Mountain View residents reportedly walked directly to work, according to the 1960 census, a number greater than those who used public transit. Those who used private autos or car pools numbered 9,899 or 80 percent of the labor force at that time.

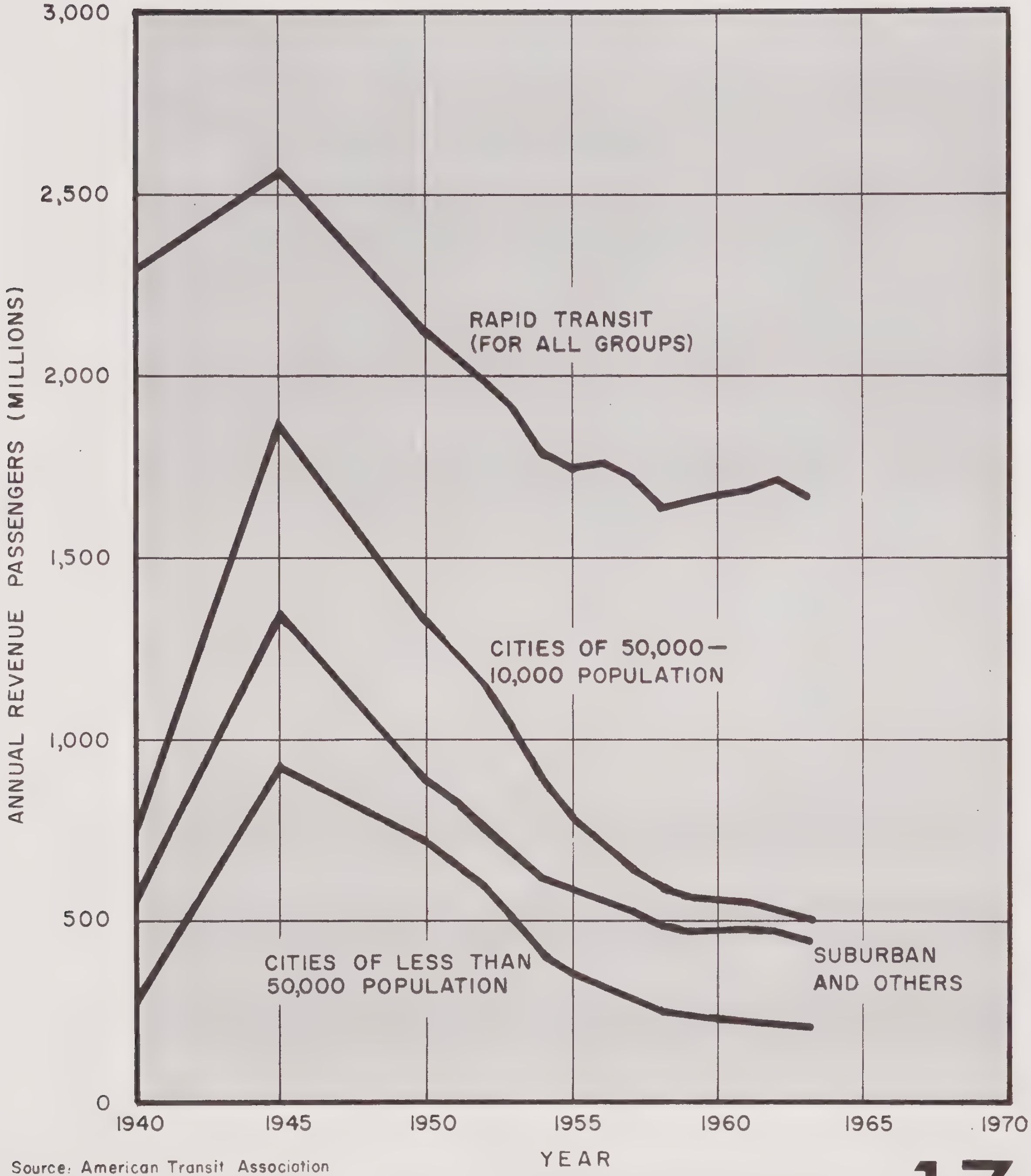
The trend in Southern Pacific patronage since 1960 has continued to decline, similar to overall national trends since 1945. The numbers of annual transit revenue passengers by population groups are shown in Table 21 and Figure 17.

Table 21

PUBLIC TRANSIT REVENUE PASSENGERS IN THE UNITED STATES
BY POPULATION GROUPS
1940-1963

		SURFACE LINES		
YEAR	RAPID TRANSIT (millions)	Cities With 50,000-100,000 Population (millions)	Cities With Less Than 50,000 Population (millions)	Suburban And Other (millions)
1940	2,282	742	291	552
1945	2,555	1,899	932	1,348
1950	2,113	1,323	728	882
1951	2,041	1,235	667	830
1952	1,982	1,161	602	762
1953	1,903	1,038	509	694
1954	1,781	899	411	620
1955	1,741	786	360	585
1956	1,749	715	324	555
1957	1,706	655	285	529
1958	1,635	596	254	494
1959	1,647	582	240	472
1960	1,670	554	230	468
1961	1,680	554	217	478
1962	1,704	533	212	468
1963	1,661	504	205	451

Source: American Transit Association



Source: American Transit Association

PUBLIC TRANSIT REVENUE PASSENGERS IN THE UNITED STATES

Although the current trend in personal transportation is clearly demonstrated to be away from public transit and toward the private automobile, it is nevertheless necessary to consider the importance and desirability of the freedom of choice presented by transit service. As the area continues to grow and population densities increase, public transit will become more meaningful. Recognizing that private autos cannot by themselves be expected to satisfy the entire demand for mobility, public officials are placing more and more significance on the need for balance in the overall system of moving people. Efforts to find and achieve such a balance must be vigorously supported.

It would be unreasonable to consider public mass transit and private automobile usage as contradictory alternatives. There are recognizable complementary roles for each mode. Mass transit cannot economically serve widely dispersed patterns of movement or trips occurring over many hours of the day. However, public mass transit can be most efficient for large groups moving during the same period of time and in significant geographic concentration.

Continued urbanization of the area will, no doubt, cause some auto owners to find it more convenient and possibly more economical to utilize public transit than to drive, for certain purposes, if reliable transit should be available. Various studies have demonstrated that transit usage decreases as vehicle ownership increases, as is happening in this area; on the other hand, it increases with increased population density. Thus, the impact on possible transit patronage associated with greater auto ownership should be counterbalanced by the more intensive use of the central area, especially where densities might approach 40 to 50 families per acre in certain areas compared to current single family subdivisions with 4 to 7 families per acre.

The expected growth in neighboring cities, too, can be expected to increase gross transit demands now served chiefly by Greyhound, along the peninsula and to San Jose.

It is also possible that certain high density employment centers may develop sufficient home-to-work trips to make public transportation feasible. Finally, there will continue to be a portion of the overall population consisting of "captive riders," such as the students now riding the train to Mountain View, and persons who either do not own automobiles or who are physically unable to drive -- all of which groups will increase in gross numbers as the area population grows.

It is significant that the greatest losses in daily transit patronage have been measured during off-peak periods and rapid transit has suffered less than other mass transit service. This fact relates to the orientation of most public transport systems toward high density central business districts.

It is generally believed that rapid transit has been more successful in retaining its patronage because it competes better with private automobiles in terms of travel speed and comfort. It is also frequently a more economical means of commuting to and from work. The current Southern Pacific service to San Francisco costs the normal five-day commuter (if he parks in the fee lot and uses the surface transit in San Francisco) $1.75 per day, an amount sufficient to cover only the cost of gasoline for the average auto on the same trip.

Especially significant for home-to-work trips along high density travel corridors, transit is a very important peak hour carrier of people. Peak hour use of principal rapid transit systems has been observed to range from 12 percent of the daily total in Toronto, to about 23 percent in Cleveland, as shown in Table 22. It is quite significant that the peak loads on the

streets and highways coincide with these same peak hours of transit patronage. About 85 percent of the day's total daily transit traffic occurs between 7:00 A.M. and 7:00 P.M., and half the daily total in the peak hours. Its greatest service is measured when the need for relief is greatest on an over-crowded street system. However, as much as four times the equipment capable of being operated profitably during other periods might be required during the peak hours. This fact represents a serious operating problem related to this very important peak hour service.

Table 22

DAILY AND PEAK-HOUR RAPID TRANSIT PASSENGERS IN MAJOR CITIES
TYPICAL WEEKDAY

CITY	24 HOUR VOLUME	PEAK HOUR VOLUME	PEAK HOUR PERCENTAGE
New York City	4,490,000	672,000	15.0
Boston	616,000	106,000	17.2
Philadelphia	570,000	94,000	16.5
Chicago	559,000	107,000	19.2
Toronto	250,000	30,000	12.0
Cleveland	80,000	18,000	22.5

Source: Gottfeld, Gunter, Rapid Transit in Six Metropolitan Areas, U.S. Government Printing Office, November, 1959.

Such factors as trip purpose, family income, population density, and auto ownership will determine the final role, the amount of patronage, and the real significance of public transportation in a particular area. It is generally felt that work trips will be most "transit-oriented." Especially with the decentralization taking place in this area, shopping and business trips are less likely to be on transit and social-recreational trips are least likely to be. The forenamed correlation of car ownership and transit usage,

revealing that transit usage decreases as the number of cars per household increases, is of significance in this area.

Population density, car ownership and central business district trips are related; but with the increases in CBD trips occurring at a greater rate than for transit trips. The special role of public mass transit is, therefore, accented in serving the central city.

Conditions favorable to mass transportation are afforded by high density land use. The riders can be attracted and satisfactory service can be scheduled. Low density areas will require secondary feeder or shuttle vehicles. For all practical purposes, private autos serve this purpose in most parts of the country at the present time. In Mountain View, the commuter parking facilities are evidence of this use of private vehicles.

In the future an important complement to the freeways in the mass movement of people will be provided by rapid transit, especially during the periods of peak demand, as explained above. The use of rapid transit will also make possible the existence of high density areas such as established business districts and new multi-family apartment areas by decreasing the parking space demands in and around these areas and offering reserve capacity for future growth.

This is not to say that the construction and successful operation of rapid transit will eliminate the need for auto parking areas. The emphasis is on potential reduction of parking needs in central business districts or other high concentrations of activity. However, though the downtown area parking space demands might be reduced by virtue of mass transit serving those who would enter the area to work, shop, or do business, it is clear that a counterbalancing need for parking space near transit stations will exist for those local yet outlying residents who would use the transit for travel

to other areas. Therefore, specific studies relating to rapid transit patronage in the Mountain View study area should consider and quantify the directional characteristics of the passenger traffic. If a Mountain View passenger station is found necessary to serve the needs of those destined principally to other Bay Area locations, the use of a location adjoining the CBD, such as the current railroad station, could be a liability to the merchant and business community because of the need for parking area and because of the non-CBD oriented, transit-supplementary vehicular traffic. In a case like this, the station location might be more properly located outside the central area. For example, if mass transit were to follow or parallel the Southern Pacific alignment, a location on Evelyn Avenue just east of the Stevens Freeway would permit expanded parking facilities and provide reasonably attractive access by means of the freeway system.

If studies show the rapid transit passengers to be shoppers, businessmen, and others entering Mountain View (without need for auto transport here), the station might be located in the CBD with only modest provisions for parking private vehicles.

The wish to privide both of the stations described should be evaluated in light of the operating capabilities of the rapid transit equipment. Too many stops, located close together, will make it impossible to provide "rapid" transit. Connecting surface transit seems to be the best available mass means of distributing passengers in the local area surrounding rapid transit stations, and should be considered preferable to added stations.

Completion of the freeway system, now taking shape in the area, will not preclude the need for public transport, especially in urbanized areas such as Santa Clara County is envisioned to be. However, neither can the freeway system be outmoded by rapid transit. Although they do support each other, the essential needs for the two modes are independent. Practically

all holiday, weekend, and off-peak travel needs must continue to be served by freeways. The optimum service to the area's increasing population will be provided by public transit in balance with private vehicular transport. Each mode will serve the movement for which it is most appropriate.

At the present time, work is underway to determine the overall transportation needs of the nine-county Bay Area in a comprehensive survey being conducted by the Bay Area Transportation Study Commission. It is, therefore, incumbent on the officials of the City of Mountain View to cooperate closely with this agency, in order to derive the greatest value from the information which will be developed in terms of both highway and transit modes. In addition to the Bay Area Transportation Study (BATS), it is understood that the County of Santa Clara is considering the initiation of a somewhat more localized study with some emphasis on the use of mass rapid transit and bus service in this area. The City of Mountain View, in assessing its needs for future transportation, must also keep abreast of the County's plans for this transportation study and cooperate fully in its administration, if initiated. The quality of the planning information supplied to such study agencies will be reflected in the reliability and utility of the final conclusions and recommendations.

Local Bus Service

Because of a continuing interest in the possible use of buses in Mountain View to absorb some of the local transport needs, the following information is presented.

Nothing is known of the propensity of each Mountain View resident toward the use of buses for his local travel needs. However, analagous situations can be considered to assist in evaluating local usage.

The nearby city of Palo Alto currently provides bus service for many of its residents and neighbors. The buses run on five lines serving principally the Charleston Road-Arastradero Road area, East Palo Alto, and part of Menlo Park. The focal point of the various lines is at the railroad station, and the service is oriented toward the Palo Alto central business district centered along University Avenue. Between 6:00 A.M. and 7:00 P.M., service is on a basic 30-minute headway, with some extra trips in peak periods. Fares are 25 cents for adults and 15 cents for children.

During the first quarter of 1964, the average number of daily cash fares paid on all lines was 1,318. During the same period in 1965, the total was 1,439, indicating a 9.2 percent increase in patronage. The average daily cash fares received during the 12-month period ending March 31, 1965, was 1,390.

Although the City of Palo Alto owns the buses, they are operated by a private firm under an agreement providing for a direct subsidy of 21 cents per bus mile, and amounting to the sum of $67,000 per year for current routings and schedules. No additional subsidy is received from any other source, public or private. The operating cost for these 35 passenger buses is reported to be approximately 51 cents per mile. The remaining 30 cents is covered by the cash box fares, and apparently includes a margin of profit.

The Palo Alto City Traffic Engineer estimates that the bus routes are located in such a manner that approximately 40,000 people live within 1,200 feet of the service. This distance is generally accepted as a reasonable maximum walking distance for bus riders. Based on this population estimate and the reported average number of cash fares (which are approximately double the number of persons using the buses) the daily bus usage amounts to less than 2 percent of the population in the area served.

Information from the State of California Public Utilities Commission indicates that the percentage of people who lived within reasonable walking distance of bus lines and rode buses daily varied from 1.2 percent to 10.2 percent of the population in different parts of the state about 8 to 10 years ago. Since that time, transit revenues have been decreasing throughout the entire nation, as previously noted. In Eureka, with a population of 35,000, only 550 or 1.6 percent used the buses on an average weekday of 1963. These findings tend to indicate that in the Mountain View area, a figure on the order of 1.5 percent of the population within reasonable walking distance of the bus line might be a reasonable estimate in attempting to approximate the patronage generated by new intra-city bus service. Based on these considerations, it is further concluded that a significant subsidy would be required for private operation, or as an alternative the City could consider, as a policy matter, that the benefits derived from bus service would warrant City operation paid partly out of taxes.

These conclusions agree with the results of recent comprehensive traffic surveys and research results. The potential for public transit in a city of Mountain View's projected future size and character is somewhat limited. Any future bus system that might be initiated could be expected to handle, at most, only a small portion of the internal person trips each day, in the range of 4 to 6 percent at best. This total, although important to the bus riding contingent of the population, would have a negligible effect on the need for the major street system proposed in this report and on the freeways being used and constructed in the Mountain View area. On the other hand, it should be clearly recognized that the improvements recommended for the street system will not only accommodate but also benefit appreciably any public bus service which may be provided in the future.

Chapter V

MAJOR STREET PLAN

The character of future traffic demands were identified in the previous chapter. In this chapter, a system of streets to serve these demands is described.

The transportation needs of urban and suburban areas are complex. Autos, taxis, trucks, buses, and pedestrians, each with individual and unique requirements, are intermixed in the flow of traffic. Each roadway in a street network must contribute to the integration of these individual requirements for minimum delay and to the segragation of vehicular and pedestrian traffic for maximum safety.

Classification of Facilities

No single class of street can be expected to serve all types of demand. A well-balanced major street and highway plan must include various classes of major route facilities, each designed to serve a particular function. They are usually classified as follows:

- Freeways and expressways
- Arterials
- Collector streets
- Major local streets (business, industrial, etc.)

Freeways are divided highways with full control of access and grade separations for all intersecting traffic flows. There are no intersections at grade, traffic signals, pedestrians, or parking on freeways to interfere with the continuity of high-capacity high-speed traffic flow. They also provide

for the rapid and safe movement of large volumes of traffic over relatively long distances. Expressways are partially developed freeways on which some or all intersections are not grade separated.

Arterials are the major streets which serve large volumes of through traffic between different sections of the urban area and provide access to the freeway and expressway. While arterial streets may serve abutting properties, their primary function is to provide for through traffic movement. A properly developed major arterial system will help define residential neighborhoods, not sever them. They should also be of sufficient capacity to prevent the undesirable diversion of through traffic to local streets.

Collector streets connect residential neighborhoods or other areas of homogeneous land use with arterial streets. They serve a dual purpose by providing a means for through-traffic movement within a limited area and giving direct access to abutting property. The design of collector streets is properly a part of good neighborhood planning. They should be planned so as not to attract large volumes of through traffic nor to disrupt the areas they serve.

Major local streets are streets which serve heavy volumes of terminal traffic usually generated by business and commercial establishments. The principal difference from major arterials is the character of traffic served. The primary function of a major local business street is to provide for local traffic movement and land access -- not through traffic; physical standards and regulations for traffic operations may differ, therefore, from those applied to major arterials. Castro Street, in the central district, is an example of a major local business street. El Camino Real, due to the pattern of local development, is presently serving the dual role of arterial and local business street. However, as through traffic is diverted to other routes with fewer vehicular conflicts, the character of El Camino Real will

shift to that of a local business street in Mountain View and also permit a collector street function.

Minor local streets are not included in a major street plan.

Desirable Speeds - Freeways and expressways are designed for relatively long trips and speeds of 50 to 60 miles per hour. Arterials are planned for shorter trips and overall speeds of 25 to 35 miles per hour. Overall average speeds of about 25 miles per hour should be obtainable during peak flow periods on arterials. Overall speeds on collector streets should range from 20 to 25 miles per hour, whereas the average acceptable speed on major local streets can be relatively slow; 10 to 20 miles per hour is suggested as tolerable at certain times.

Selection of Test Plan

The current major street system within the study area is basically the network used in the test plan -- due to the current level of land development, few alternate trafficways are feasible without the acquisition and clearing of many existing privately improved properties. Of course, routes planned by the State (Stevens Freeway and improvements to Mountain View-Alviso Road and to El Camino Real) and by the County (Central Expressway and Foothill Expressway) were included. An interchange was added to the Stevens Freeway at Middlefield Road, anticipating the long range need for additional access to the triangular area between the Bayshore Freeway, Stevens Freeway, and Mountain View-Alviso Road. Assignments showed that this is warranted, although no ramps to serve movements from the north to the west and vice versa should be required. More attractive alternatives will be available for these movements.

The Middlefield Road and California Street-Dana Street routes previously proposed by the existing General Plan were also included. To increase the

overall north-south traffic capacity, a Grant Road-Phyllis Avenue-Calderon Avenue route to the Central Expressway and to Moffett Boulevard and Stierlin Road via Central Avenue has been introduced.

1985 Traffic Assignment

To estimate the travel demands on each route, the 1985 trip origin-destination matrix of desires was assigned to each link in the selected major route network. An assignment program developed by Wilbur Smith and Associates utilizes the California freeway diversion equation. In this program, two routes for each zone to zone movement are selected. One has the shortest travel time on arterial and local routes only; the other includes freeway routes also. The time and distance differentials are compared in the diversion equation to give the portion of traffic assigned to each route. The resulting assignments to each link in the network are accumulated as each zone to zone movement is analyzed. Because this procedure would require a myriad of manual calculations, the program was adapted for use in high-speed electronic digital computers.

The computer assignment amasses traffic and creates volume discontinuities at zonal centroids and, therefore, a manual refinement of the assigned values, based on knowledge of the land use in each zone, is necessary. The resultant assignment is illustrated by a traffic flow map in Figure 18. This flow map depicts none of the through traffic which will use the Stevens Freeway, Bayshore Freeway, or Foothill Expressway. However, that segment of through movements which utilize some portion of the Mountain View major street system is included.

Major Street Design Standards

Although design standards of major streets vary considerably within any given area, lane widths of 12 feet on arterials and a minimum of 11 feet on collectors and one-way facilities are recommended. Parallel parking lane

NOTE: NUMBERS IN PARENTHESES
DO NOT INCLUDE THROUGH TRAFFIC

TRAFFIC SCALE

40,000 30,000 20,000 10,000 5,000

VEHICLES PER DAY, AVERAGE DAILY TRAFFIC

1985 TRAFFIC VOLUMES

18

NORTH

0 1 2 3 4 5 6

MAP SCALE IN THOUSANDS OF FEET

MOUNTAIN VIEW
TRAFFIC CIRCULATION STUDY
Wilbur Smith and Associates

widths of 8 to 10 feet are desired to provide good separation between parked vehicles and moving traffic. A 10-foot width allows use of such lanes for right-turn lanes at intersections, or possible conversion to through traffic lanes.

Raised medians to separate opposing traffic are advisable whenever possible and should be curbed, with few openings, if any, except at intersections. Medians on major streets should be 16 to 24 feet wide; 4-foot medians on arterials in urban areas are permissible but they should be widened to at least 12 feet near intersections if left-turn pockets are to be provided.

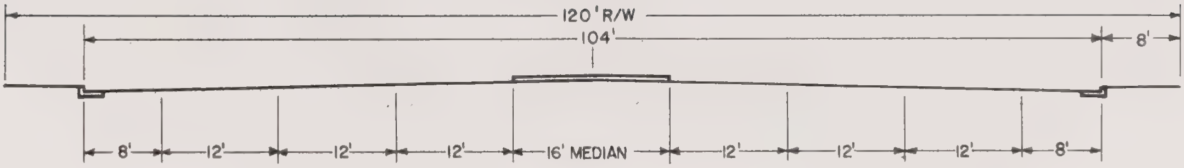
Border widths can vary depending upon the zoning, intended pedestrian use, and right-of-way width. A width of at least 7 feet between curb and property line is recommended, a measure which should be increased considerably within the business district or other areas with heavy pedestrian traffic.

Major streets designed to move six lanes of traffic and permit parking require rights-of-way of at least 104 feet in width; provision for four moving lanes requires 80 feet; and a standard right-of-way of 60 feet is adequate for local streets where two moving lanes are sufficient.

The cross sections illustrated in Figure 19 are those currently specified for street design by the City. They are above the minimum standards described above, and are therefore recommended for continued general use in Mountain View.

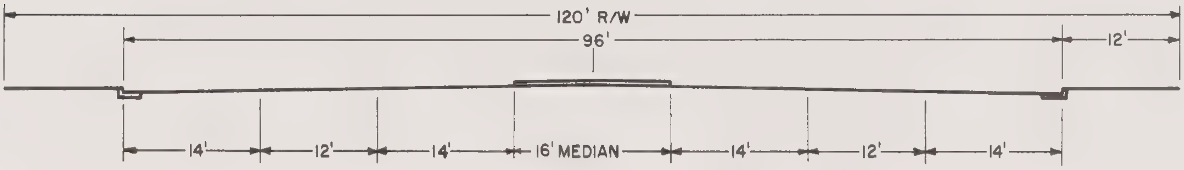
It is realized that in some cases the most desirable roadway section is not now obtainable due to right-of-way restrictions where additional acquisition is considered to be a handicap to the property owners. However, the future success of the plan detailed in this report is based on observance of ade-

A



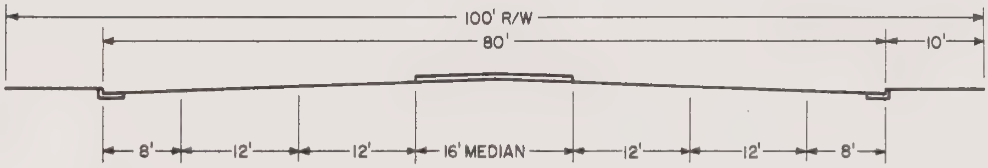
SIX LANE ROADWAY WITH PARKING

B



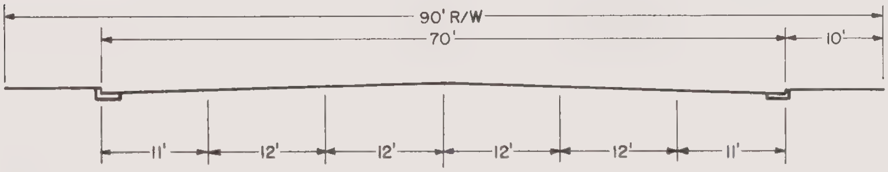
SIX LANE ROADWAY WITHOUT PARKING

C



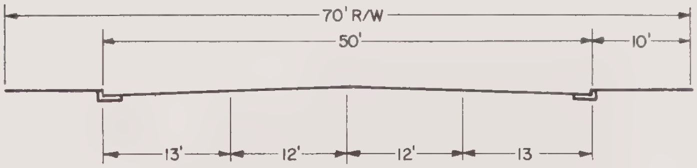
FOUR LANE ROADWAY WITH PARKING

D



FOUR LANE ROADWAY WITH RESTRICTED PARKING

E



MINOR ARTERIAL OR COLLECTOR

19

TYPICAL ROADWAY CROSS - SECTIONS

MOUNTAIN VIEW
TRAFFIC CIRCULATION STUDY
Wilbur Smith and Associates

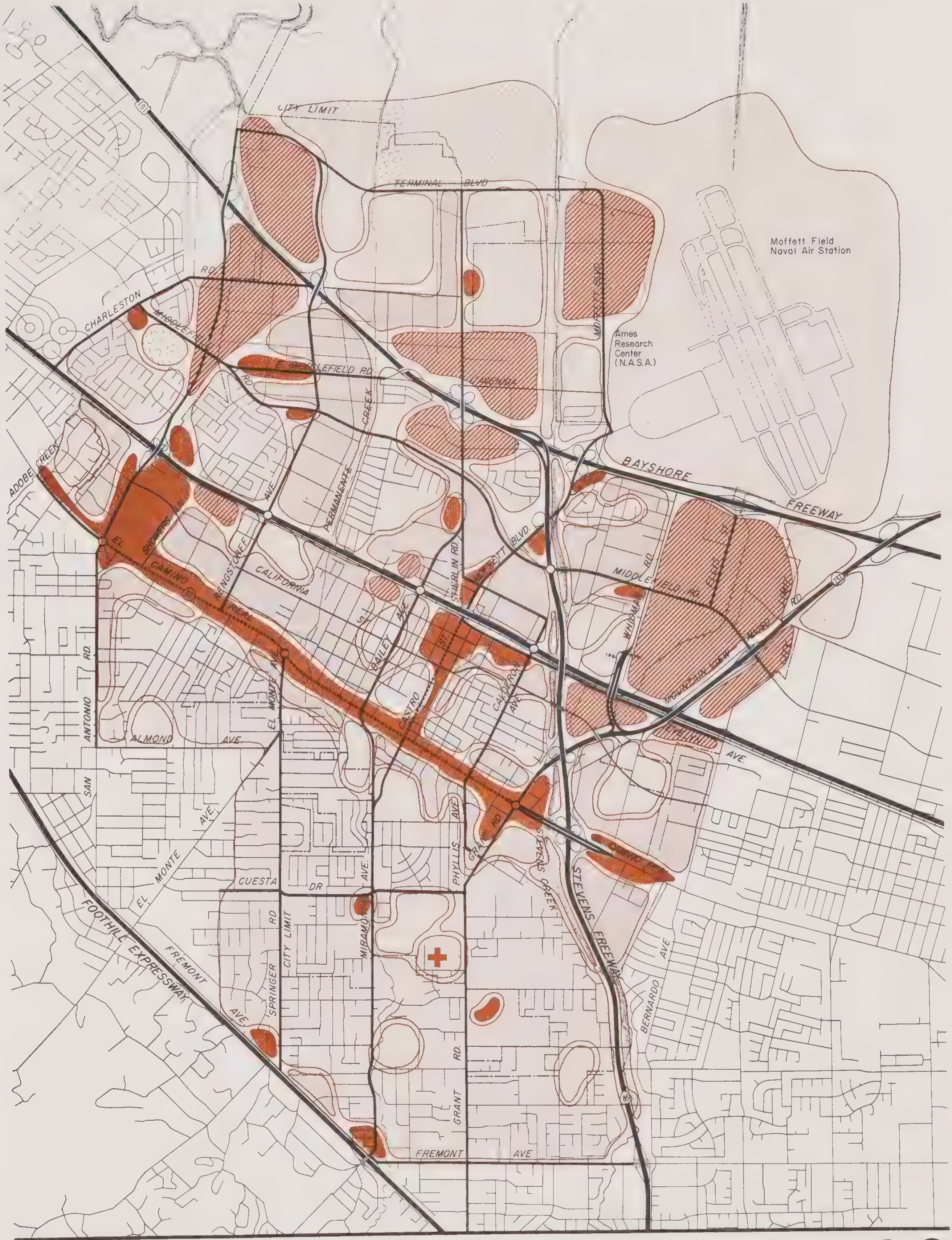
quate design standards. The importance of sufficient right-of-way, generously spaced setbacks and street plan lines in developing areas, and provisions for continuity of through streets is obvious.

Description of Major Street Improvements

The development of each street in the recommended plan is discussed briefly in the following paragraphs. The recommended plan is shown in Figure 20, and a detailed tabulation of estimated volumes and proposed cross-sections appears in Appendix Table B-1.

Bailey Avenue - Bailey Avenue should be improved to a six-lane divided arterial to serve traffic between El Camino Real and the Central Expressway. Initially, the curb lanes could be used for parking and as the traffic volumes increase, the curb parking could be prohibited during peak hours. Ultimately, however, the six lanes will have to be used to move traffic throughout the day. Between El Camino Real and California Street, Bailey Avenue will carry a daily volume of 25,000. To permit 35,000 vehicles per day to cross the Southern Pacific tracks, a six-lane grade-separation structure must be provided, including necessary ramps for interchange with the Central Expressway. Between the Central Expressway and Stierlin Road, a four-lane divided route should handle the estimated 20,000 - 23,000 daily traffic volume.

Calderon Avenue - With an improved Phyllis Avenue, Calderon Avenue should be improved to a four-lane arterial with parking restricted during peak traffic hours. This would be adequate to carry the predicted 20,000 - 24,000 vehicles per day. A six-lane grade-separated structure should be built crossing the Southern Pacific tracks and interchanging with the Central Expressway. Because only a small portion of the traffic crossing the tracks (5,000 of 37,000) uses Calderon Avenue to the north, extra turning lanes to and from the Expressway will be required. North of the Central Expressway



20

MAJOR ROUTES

- LIMITED ACCESS
- ARTERIAL
- COLLECTOR
- LOCAL BUSINESS
- GRADE SEPARATED INTERCHANGE

GENERALIZED LAND USE

- LOW-MEDIUM DENSITY RESIDENTIAL
- HIGH DENSITY RESIDENTIAL
- COMMERCIAL
- INDUSTRIAL
- PUBLIC & SEMI-PUBLIC
- MOFFETT FIELD & AMES RESEARCH CENTER
- HOSPITAL

NORTH

0 1 2 3 4 5 6

MAP SCALE IN THOUSANDS OF FEET

MOUNTAIN VIEW
TRAFFIC CIRCULATION STUDY
Wilbur Smith and Associates

MAJOR STREET PLAN WITH FUTURE LAND USE

to Central Avenue a minimal arterial cross-section will be required for the estimated 5,000 vehicles per day.

California Street - The existing four-lane cross-section on California Street between San Antonio Road and Rengstorff Avenue should extend to Hope Street and a cut-through connection to Dana provided between Hope and Bush. This will entail terminating sections of California Street and View Street to avoid unwieldy channelization. This route will facilitate cross-town movements and traffic from Sunnyvale via Dana Street.

Castro Street - Future traffic volumes will require that Castro Street, throughout its length, be improved to a four-lane width, with a median divider required between El Camino Real and Evelyn Avenue to facilitate turning movements in the downtown area. (A construction project to improve Castro Street to these standards is now under way between El Camino Real and California Street.) Although a grade crossing would accommodate the passage of the projected 17,000 vehicles per day at the Southern Pacific tracks, the hazard involved will necessitate a grade separation. Special design studies will be necessary to ensure the compatability of the grade separation structure and the future requirements of the business district.

If Castro Street were to terminate at the Southern Pacific tracks, the traffic projected for this crossing would be diverted to other crossings. This shift would overload the adjacent railroad crossings. However, this condition could be alleviated with direct ramp connections between the Central Expressway on the west and Stevens Freeway on the south, which would relieve the Calderon Avenue crossing.

Central Expressway - Within the study area limits, the Central Expressway should be developed to an ultimate six-lane standard in order to carry the 35,000 - 40,000 vehicles per day estimated by 1985. Grade-separated

interchanges, in addition to existing ones, will be required at Rengstorff Avenue, Bailey Avenue, Calderon Avenue, Stevens Freeway, and Whisman Road. A grade-separated crossing, without interchanges, will be required at Castro Street.

Charleston Road - To carry a volume of 14,000 - 17,000, Charleston Road between the Central Expressway and the Bayshore Freeway should be a four-lane facility. On the other side of the Bayshore Freeway, it will act as an industrial/residential collector and with the nominal volume (3,000 vehicles per day) assigned to it, a two-lane minimal arterial standard should suffice.

Cuesta Drive - Cuesta Drive is the first continuous east-west street south of El Camino Real. To adequately handle the basically residential traffic imposed upon it by 1985 between Springer and Grant Road, right-of-way for a four-lane facility should be acquired. Whether or not a median divider is required will depend on the number of intersecting movements permitted along this thoroughfare.

Dana Street - To furnish a continuous collector street paralleling El Camino Real, a Dana Street extension is proposed through Calderon Avenue and over Mountain View-Alviso Road connecting with Washington Avenue in Sunnyvale. It should conform with the current four-lane design for California Street with which it connects.

East Middlefield Road - East Middlefield Road should be developed in accord with its current four-lane design throughout its entire length. With this cross-section, it will carry the anticipated daily volume of 25,000 vehicles per day.

El Camino Real - As alternative routes become available and commercial development increases along El Camino Real, its function will change from an arterial route to a local business and collector street. Speeds will be reduced by the increased number of conflicting traffic movements. Through traffic will be diverted to more convenient routes. Commercial development planned for this vicinity will generate traffic in excess of the capacity of at-grade intersections to the degree that future traffic volumes will warrant the installation of grade-separated interchanges and special channelization at major crossings. Interchanges will be required at San Antonio Road and Grant Road due to heavy intersecting volumes. Left turns to El Monte Avenue from El Camino Real will require a "fly-over" to permit these movements. At other intersections along this route, careful planning should be used in laying out channelization. A minimum six-lane divided route will be required throughout its length in the study area, with possible widenings for turning lanes at special locations.

Ellis Street - Ellis Street will remain an industrial arterial. An undivided four-lane arterial with restricted parking will be adequate for the estimated daily volume of 14,000 vehicles.

El Monte Avenue - The importance of El Monte Avenue as an arterial will increase when it connects with the Foothill Expressway and Junipero Serra Freeway. Within the limits of the study area, it should be a four-lane route, to carry the anticipated 20,000 - 25,000 vehicles per day.

Evelyn Avenue - Between Castro Street and Calderon Avenue, Evelyn Avenue need only have a minimum arterial cross-section. However, eastward to Bernardo and into Sunnyvale, a divided four-lane roadway is recommended to carry the higher volumes and turning movements at the half-diamond interchange connecting with Stevens Freeway. Also, the jog in Evelyn Avenue at Castro Street should be eliminated to reduce turning conflicts.

Fairchild Drive - This frontage road should be increased to four moving lanes to adequately handle the predicted volumes (5,000 - 14,000 vehicles per day).

Grant Road - To carry the estimated volumes, Grant Road shuold be widened to include four lanes with a median divider throughout most of its length. However, between Cuesta Drive and Martens Avenue (an assumed Phyllis Avenue connector to Grant Road), a six-lane divided route will be required. Special consideration must be given to the channelization along this section to avoid bottlenecking the anticipated 33,000 daily traffic.

L'Avenida - The status of L'Avenida between Stierlin Road and Moffett Boulevard north of the Bayshore Freeway will change from a local street to an arterial street. A two-lane standard cross-section will be required to carry the 10,000 vehicles per day.

Middlefield Road - Throughout most of its length, Middlefield should be a divided four-lane arterial to handle the anticipated daily volume ranging from 17,000 to 25,000 vehicles. However, between San Antonio Road and the Y-intersection with East Middlefield Road, a divided six-lane cross-section will be required along with adequate channelization at the intersection to clear the 40,000 vehicles predicted.

Miramonte Avenue - Miramonte Avenue should be constructed to a four-lane standard except, like Grant Road, south of Martens Avenue, where it should be built with six moving lanes and special channelization between Cuesta Drive and, in this case, Castro Street.

Moffett Boulevard - Between the Central Expressway and the Bayshore Freeway, a four-lane arterial route should be constructed to handle the 14,000 - 21,000 vehicles per day predicted by 1985. North of the Bayshore Freeway,

between Ames Research Center and Terminal Avenue, a minimum arterial is required to carry the volume (5,000) predicted in this study. However, current land use projections for the sector north of the Bayshore Freeway assume a relatively small percentage of these lands will be developed by 1985; therefore, additional right-of-way should be considered for future needs.

Mountain View-Alviso Road - When the section of this route north of the Central Expressway has been completed to freeway standards, it should comfortably carry the estimated volume of 30,000 - 45,000 vehicles per day.

Phyllis Avenue - This street should be widened to a four-lane arterial route to serve as a connecting link from Grant Road to Calderon Avenue at El Camino Real where a slight re-alignment will be necessary. Plans are currently under way to increase the distance between the Cuesta Drive and Phyllis Street intersections. Phyllis Street should be terminated in a cul-de-sac at Grant Road and traffic diverted along a Martens Avenue extension to Grant Road.

Rengstorff Avenue - Between El Camino Real and Middlefield Road, Rengstorff Avenue will require four moving lanes to carry the estimated 14,000 - 25,000 daily traffic. A grade separation at the Southern Pacific tracks will be required, including an interchange with the Central Expressway. The remainder of Rengstorff Avenue, from Middlefield Road to Terminal Avenue south of the Bayshore Freeway, will only require a two-lane arterial design. Again, because the 1985 land use projections for areas north of the Bayshore Freeway are considerably less than the ultimate potential development, additional right-of-way should be considered.

San Antonio Road - South of El Camino Real, a divided four-lane cross-section should be constructed to carry the estimated 25,000 daily traffic volume. As noted before, a grade-separated interchange will be required

at El Camino Real. Between El Camino Real and Middlefield Road, a six-lane cross-section will be required. North to Bayshore Freeway the projected volume decreases to 21,000, and the required number of lanes drops to four. North of the Freeway, the existing roadway design standard of 50 feet between curbs will be adequate.

Springer Road - A four-lane roadway should be constructed to provide the capacity to move the projected 8,000 - 13,000 vehicles per day.

Stierlin Road - Between Central Avenue and Bailey, an undivided four-lane roadway will suffice, and throughout the remaining length of Stierlin Road a divided four-lane street is recommended.

Terminal Avenue - Although, based on current data on proposed land use, the projected volume on this route is only 2,000 vehicles per day, right-of-way acquisition sufficient for a divided roadway is suggested. This would permit expansion necessary to serve extreme peak recreational influxes if and when the planned "Bay Front" recreational area becomes operational. Also, a divided roadway could be landscaped to harmonize with the park atmosphere.

Whisman Road - Whisman Road should be a four-lane roadway to carry the estimated 10,000 - 11,000 vehicles per day consisting mainly of industrial traffic.

Central Area

The major street system improvements necessary to serve 1985 traffic needs are discussed in the preceding section. In addition to the needs of the overall system, special consideration was given the central area of the city to determine possible requirements relating to the business district traffic.

The widening of California Street and its connection with a widened Dana Street between Hope and Bush Streets has been detailed on page 92. Improvements of Castro Street and Evelyn Avenue have also been discussed (pages 92 and 94, respectively). These improvements constitute the principal physical changes necessary in the CBD street system. Specific traffic assignment to the central area streets indicates them to be capable of serving the projected needs if the several street projects described are completed. However, traffic conditions in this limited area will in time require operational changes, particularly to accommodate peak hour traffic. For example, Dana Street between Bush Street and Bailey Avenue will probably require peak hour parking prohibitions. Due to its convenient location and intersection flow characteristics at Bush Street, it will probably attract traffic travelling to the CBD from the east. Then, as the general business district traffic activity increases, consideration should be given to the regulation of Bryant and Hope Streets between California and Evelyn for one-way traffic — not for conducting traffic through or around the area to by-pass it, but rather as aids to localized circulation. Such being the case, Bryant Street would flow northerly and Hope Street in a southerly direction. Figure 21 illustrates a preliminary plan for the central area street system.

The estimation of future traffic volumes within a terminal area such as the CBD is much less accurate than on the arterial network, due to the many and diverse circulatory movements. It is therefore difficult to state a firm estimate of the hours of peak flow or the amount of curb parking to be restricted. Such decisions should be made on the basis of measured experience, preferably by the City Traffic Engineer.

In sum, the current Castro Street improvement together with those recommended here for the major street system are indicated to be all the physical changes in the central business district street layout necessary to

NOTE: REPRESENTATIONS OF GRADE-SEPARATIONS AND INTERCHANGES ARE FUNCTIONAL ONLY; NOT TO SCALE.

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CENTRAL AREA STREET PLAN - 1985

MOUNTAIN VIEW
TRAFFIC CIRCULATION PLAN
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serve the 1985 traffic. For this reason, it is recommended that the City should consider curb parking prohibitions when additional capacity is needed, rather than undertaking vast programs of property acquisition for street widenings, in this central area.

Benefits from Major Street and Highway Improvements

With the current increase in population and industrialization the amount of travel will increase. Safe facilities of adequate capacity will be required to serve the additional traffic, or problems of traffic congestion will become more severe. The recommended major street plan for Mountain View, related to the projected 1985 land utilization, has been depicted in Figure 20 and discussed in some detail in this chapter.

Some benefits of the recommended plan would be:

- Reduction of traffic congestion and its resultants — delays and accident potential.
- Elimination of conflicts between motor vehicles and trains as the result of providing grade separations at the railroad crossings.
- Elimination of offsets in intersections on major arterials which offer hazard and inconvenience to drivers.
- Reduction of through traffic on local and collector streets in residential neighborhoods.
- Improved access to principal business, commercial and industrial areas.

The adoption and implementation of the plan recommended will provide Mountain View with a major street network, connecting with the area-wide expressway and freeway system, to effectively accommodate the 1985 traffic.

Continuing Study

The plan recommended here for the Mountain View major street system in 1985 is developed on the basis of the most reliable and factual data currently available. It must be understood, however, that the actual development cannot be expected to adhere in specific detail to the pattern projected for 1985. Therefore, it is absolutely necessary that a review of land development and travel characteristics be accomplished periodically to permit consideration of necessary adjustments. In this manner, the maximum benefits can be derived from both the land use and the transportation plans.

APPENDIX

GENERALIZED LAND USE CODE LISTINGS FOR TABLES A-1 AND A-3

0 Residential (classified by dwelling type)

- 01 Single family
- 02 Two family
- 03 Three and four family
- 04 Five or more family
- 05 Farm labor
- 07 Boarding, rooming, fraternity, sorority
- 08 Trailer park

1 Industrial nonmanufacturing

- 11 Warehousing and wholesaling with stock
- 12 Extractive
- 13 Heavy commercial

2 Manufacturing (classified by relative nuisance)

- 21 N1 Inoffensive
- 22 N2
- 23 N3
- 24 N4
- 25 N5 Obnoxious
- 26 Vacant manufacturing

4 Transportation, communications and utilities

- 41 Streets -- limited access
- 42 Streets -- local
- 43 Other transportation
- 44 Communications and utilities

5 Commercial (retail trade, personal and business services)

A. Business areas dependent on pedestrian customer interchange

Shopping centers

- 50 Regional (department store)
- 51 Community (junior department store or large variety store)
- 52 Neighborhood (supermarket)

Other shopping areas

- 53 San Jose Central Business District
- 54
- 55 Major business districts
- 56 Local business districts
- 57 Small clusters and isolated stores

GENERALIZED LAND USE
CODE LISTINGS
FOR TABLES A-1 AND A-3
(Continued)

B. 58 Self-generative businesses (auto-oriented and drive-in businesses and strip commercial)

C. 59 Offices, banks and clinics

7 Public and quasi-public buildings
- 71 Schools (less playgrounds and playfields)
- 74 Public buildings
- 75 Hospitals
- 76 Churches
- 77 Other quasi-public buildings

8 Public and quasi-public open spaces
- 81 Neighborhood parks
- 82 Playgrounds
- 83 Urban parks
- 84 Playfields
- 85 Metropolitan or regional parks
- 86 Other public open space uses
- 87 Commercial open space uses
- 88 Nonprofit open space uses
- 89 Cemeteries

9 Agricultural, open land, and vacant urban
- 91 Agriculture: Orchard
- 92 Agriculture: Non-orchard, intensive cultivated
- 93 Grazing, range land
- 94 Agriculture: Livestock, dairy, other animals
- 95 Flood control, water supply, and irrigation lands
- 96 Forest, brush, and grasslands
- 97 Water areas
- 98 Marshlands
- 99 Vacant urban

Source: City of Mountain View Planning Department

TABLE A-1

GENERALIZED LAND USE BY TRAFFIC ZONE
January, 1964

ZONE	GLU[a]	ACRES	DU[b]
1	97	1,207.32	-
	95	22.73	-
	98	102.28	-
	12	1,056.42	-
Total		2,388.75	-
2	01	5.54	13
	02	1.94	4
	03	1.00	3
	08	.54	20
	11	4.30	-
	13	10.53	-
	22	10.11	1
	26	1.80	-
	41	27.75	-
	42	3.95	-
	44	1.46	-
	58	2.30	-
	59	3.60	-
	92	54.77	-
	93	204.94	1
	99	26.08	-
Total		360.61	42
3	01	76.90	107
	02	4.04	12
	04	1.00	5
	11	1.00	1
	13	7.87	2
	41	-	-
	42	24.74	-
	44	20.70	-
	57	.40	-
	71	2.00	-
	82	3.00	-
	92	444.93	-
	93	92.40	-
	94	2.00	-
	95	22.35	-
	99	366.69	-
Total		1,070.02	127

ZONE	GLU[a]	ACRES	DU[b]
4	01	55.19	86
	04	22.75	154
	11	.45	-
	13	1.54	1
	21	12.34	2
	23	1.40	-
	41	36.31	-
	42	19.74	-
	44	8.69	-
	57	21.23	-
	58	1.79	-
	91	30.21	4
	92	67.88	-
	93	43.27	-
	94	5.50	2
	95	5.55	-
	99	35.32	-
Total		369.16	249
5	41	22.08	-
	42	5.83	-
	74	1,391.27	-
Total		1,419.18	-
6	01	400.04	1,907
	02	13.09	86
	03	5.45	71
	04	53.85	1,067
	11	26.99	-
	13	20.74	-
	21	37.53	-
	22	8.13	-
	23	1.20	-
	25	.34	-
	26	3.64	-
	41	14.91	-
	42	188.09	-
	43	6.32	-
	52	8.77	-
	57	3.48	-

TABLE A-1 (Cont.)

ZONE	GLU[a]	ACRES	DU[b]
(Cont.)			
6	58	21.01	-
	59	6.55	-
	71	38.08	-
	74	.82	-
	75	4.24	-
	76	7.69	-
	81	2.75	-
	82	10.87	-
	84	15.00	-
	91	8.55	-
	92	11.29	-
	94	2.59	-
	95	1.41	-
	99	162.80	-
Total		1,086.22	3,131
7	01	155.83	1,027
	02	3.55	50
	03	1.66	24
	04	5.40	204
	08	10.46	143
	11	3.68	-
	13	15.06	-
	21	13.23	-
	22	1.55	-
	23	.60	-
	24	.36	-
	25	.30	-
	26	.69	-
	41	46.39	-
	42	114.20	-
	43	1.25	-
	44	29.32	-
	51	.50	-
	57	7.44	-
	58	8.59	-
	59	.35	-
	71	24.42	-
	74	6.30	-
	76	.34	-
	77	3.24	-
	82	10.40	-
	84	.42	-
	91	16.29	-
(Cont.)			
7	92	146.30	-
	95	2.89	-
	99	206.33	-
Total		837.34	1,448
8	01	61.38	346
	02	27.53	274
	03	4.88	64
	04	23.90	710
	08	1.40	22
	13	.48	-
	21	.12	-
	23	-	-
	26	-	-
	41	22.48	-
	42	51.44	-
	43	2.30	-
	44	3.93	-
	56	1.53	-
	57	.13	1
	58	5.85	-
	59	-	-
	71	10.15	-
	82	10.40	-
	91	12.43	3
	92	49.62	13
	95	.97	-
	99	61.67	-
Total		352.59	1,433
9	01	10.11	28
	02	.45	4
	03	-	-
	04	1.57	16
	13	8.00	-
	21	98.97	1
	22	3.24	-
	23	.59	-
	24	.50	-
	26	2.26	-
	41	30.40	-
	42	34.51	-
	43	10.35	-
	44	13.33	-

TABLE A-1 (Cont.)

ZONE	GLU[a]	ACRES	DU[b]
(Cont.)			
9	56	.42	-
	58	7.69	1
	59	28.64	-
	87	-	-
	91	130.01	5
	92	192.38	-
	99	149.38	10
Total		721.80	65
10	01	47.07	190
	02	.18	2
	03	.49	4
	04	18.67	802
	11	4.36	-
	13	7.51	-
	21	1.52	-
	25	.07	-
	42	26.96	-
	43	5.32	-
	44	.35	-
	52	3.20	-
	57	2.35	-
	58	19.65	-
	59	2.73	-
	75	.89	-
	91	2.50	-
	95	3.12	-
	99	18.13	-
Total		165.07	998
11	11	.62	-
	13	8.00	-
	23	5.79	-
	42	12.09	-
	43	2.06	-
	44	2.86	-
	50	49.35	-
	57	.36	-
	58	4.78	-
	99	20.08	-
Total		105.99	-
12	01	22.60	160
	02	1.89	28
	03	.81	22
	04	27.03	547
	08	5.53	85
	13	1.31	-
	21	.66	-
	22	2.93	1
	26	.84	-
	42	25.56	-
	43	2.01	-
	44	3.59	-
	57	.78	-
	58	12.60	2
	59	.25	-
	76	.09	-
	91	15.43	-
	92	23.55	3
	99	10.42	-
Total		157.88	848
13	01	107.75	744
	02	18.07	250
	03	15.61	349
	04	48.52	1,625
	08	4.63	67
	11	2.03	-
	13	4.36	-
	21	7.56	-
	22	.19	-
	24	.50	-
	25	1.23	-
	42	73.40	-
	43	11.66	-
	56	.32	-
	57	1.32	-
	58	16.79	-
	59	2.50	-
	71	6.61	-
	75	4.19	-

TABLE A-1 (Cont.)

ZONE	GLU[a]	ACRES	DU[b]
(Cont.).			
13	76	1.95	-
	77	8.00	-
	81	24.33	-
	82	5.84	-
	91	16.42	3
	92	8.71	-
	95	.42	-
	99	26.36	-
Total		419.27	3,038
14	01	18.14	137
	02	1.75	26
	03	1.49	36
	04	3.01	104
	11	.05	-
	13	.99	-
	21	2.26	-
	22	1.39	-
	42	35.89	-
	43	6.39	-
	44	1.17	-
	52	2.82	-
	55	22.40	18
	56	-	-
	57	-	-
	58	8.85	5
	59	2.66	-
	71	9.21	-
	74	3.59	-
	76	1.43	-
	77	5.48	-
	81	-	-
	82	-	-
	84	9.20	-
	99	5.11	-
Total		143.28	326

ZONE	GLU[a]	ACRES	DU[b]
15	01	108.50	732
	02	15.95	207
	03	6.30	101
	04	28.53	733
	08	1.59	31
	11	4.32	-
	13	5.63	-
	21	.53	-
	22	1.38	-
	41	9.68	-
	42	61.86	-
	43	4.58	-
	44	1.69	-
	52	.12	-
	55	.31	-
	56	.54	-
	57	.81	-
	58	13.38	-
	59	.58	-
	71	4.74	-
	75	.47	-
	76	.52	-
	77	1.24	-
	81	.33	-
	82	6.12	-
	91	7.35	-
	99	29.29	-
Total		316.34	1,804
16	01	3.67	21
	11	20.01	-
	13	3.92	-
	21	.61	-
	22	1.95	-
	24	4.05	-

TABLE A-1 (Cont.)

ZONE	GLU[a]	ACRES	DU[b]
(Cont.)			
16	26	1.33	-
	41	47.17	-
	42	16.92	-
	43	3.12	-
	58	1.38	-
	91	29.45	4
	99	22.95	-
Total		156.53	25
17	01	17.70	16
	02	2.04	4
	03	2.70	51
	04	17.43	491
	05	1.00	5
	08	11.77	137
	11	1.45	-
	13	1.45	-
	24	-	-
	41	56.34	-
	42	29.20	-
	43	-	-
	44	.03	-
	57	.35	-
	58	2.86	-
	59	.95	-
	91	279.57	-
	92	14.02	-
	95	1.65	-
	99	30.74	-
Total		471.25	704
18	01	287.05	1,105
	02	2.25	22
	03	.15	3
	04	15.61	332
	11	.07	-
	13	.49	-
	21	.06	-
	23	.57	-
	42	104.29	-
	44	.49	-
	52	3.39	-
	56	5.40	-
	58	25.80	-
	59	1.05	-
	71	16.19	-

ZONE	GLU[a]	ACRES	DU[b]
(Cont.)			
18	76	2.10	-
	77	.23	-
	82	9.13	-
	84	16.99	-
	91	17.47	-
	95	.04	-
	99	37.13	-
Total		545.95	1,462
19	01	411.32	1,380
	02	9.51	116
	03	5.63	126
	04	13.25	486
	11	.23	-
	13	.29	-
	21	.19	-
	22	.18	-
	25	.23	-
	42	148.14	-
	44	.89	-
	55	.06	-
	56	2.06	-
	58	25.08	-
	59	2.49	-
	71	24.29	-
	74	.16	-
	76	8.18	-
	81	3.45	-
	82	19.19	-
	84	8.25	-
	87	5.20	-
	91	8.35	-
	92	10.82	-
	95	3.31	-
	99	20.20	-
Total		730.95	2,108
20	01	3.47	18
	02	2.75	28
	04	4.31	157
	08	18.52	220
	13	.45	-
	42	10.31	-
	44	.01	-
	57	8.52	-
	58	23.59	3

TABLE A-1 (Cont.)

ZONE	GLU[a]	ACRES	DU[b]
(Cont.)			
20	91	2.79	1
	92	8.60	-
	99	9.30	-
Total		92.62	427
21	01	447.36	1,593
	02	2.02	24
	03	.55	3
	11	.23	-
	42	137.95	-
	43	5.65	-
	44	1.92	-
	52	12.41	-
	56	7.97	-
	58	3.31	3
	59	11.55	-
	71	28.90	-
	74	.55	-
	75	21.59	-
	76	3.59	-
	82	11.01	-
	84	12.08	-
	91	152.44	11
	92	15.30	1
	95	3.82	-
	99	28.07	-
Total		908.27	1,635
22	01	271.81	1,028
	02	.89	6
	03	.65	4
	21	1.75	-
	41	19.78	-
	42	91.85	-
	44	3.58	-
	58	2.05	-
	71	15.28	-
	82	6.53	-
	84	26.32	-
	91	192.30	21
	92	55.02	9
	95	9.09	-
	96	.82	-
	99	26.49	-
Total		724.21	1,068

(a) Generalized Land Use
(b) Dwelling Units

Source: City of Mountain View Planning Department

TABLE A-2

TRAFFIC GENERATION FACTORS
SEPTEMBER, 1964

TRAFFIC ZONES	FLOOR AREAS BY GENERAL LAND USE				OTHER GENERATION FACTORS
	Commercial (Sq. ft.)	Office (Sq. ft.)	Public and Quasi-Public (Sq. ft.)	Industrial (Sq. ft.)	
1	-	-	-	-	-
2	5,000	-	-	66,300	-
3	-	-	-	32,000	-
4	-	-	-	108,300	Drive-In Theater (1400 Stalls)
5	Moffett Field,	Naval Air Station and Ames Research Center			
6	81,500	-	-	875,200	-
7	39,000	-	-	283,600	-
8	30,000	-	-	4,900	-
9	17,000	-	-	1,243,420	-
10	132,050	18,300	-	130,100	Motels(250 Units)
11	442,756	4,000	-	45,100	Motel (20 Units)
12	81,900	2,800	-	67,600	Motel (25 Units)
13	69,200	19,000	81,360	296,700	-
14	450,000	74,400	110,900	42,500	-
15	25,600	3,000	5,500	230,500	-
16	442,600	-	-	-	-
17	10,000	-	-	-	-
18	233,200	27,000	-	11,000	-
19	180,600	17,700	-	29,000	Motels(35 Units)
20	118,300	5,500	-	-	Motels(60 Units) Drive-In Theater (900 Stalls)
21	205,000	27,660 74,000 (Medical)	-	-	Hospital (319 Beds)
22	-	-	-	2,500	-

Source: City of Mountain View Planning Department

TABLE A-3

GENERALIZED LAND USE BY TRAFFIC ZONE
1985 PROJECTIONS

ZONE	GLU[a]	ACRES	DU[b]
1	12	1057	-
	41	40	-
	95	23	-
	97	1167	-
	98	102	-
Total		2389	-
2	01	28	140
	04	7	100
	11	5	-
	13	11	-
	21	40	-
	22	6	-
	41	28	-
	42	36	-
	44	2	-
	52	7	-
	71	75	-
	86	100	-
	98	5	-
	99	11	-
Total		361	240
3	01	105	520
	02	85	1020
	04	25	250
	23	50	-
	41	31	-
	42	87	-
	44	21	-
	52	7	-
	71	10	-
	74	2	-
	76	2	-
	81	20	-
	83	150	-
	86	150	-
	95	25	-
	99	300	-
Total		1070	1790

ZONE	GLU[a]	ACRES	DU[b]
4	01	30	45
	04	70	700
	08	15	180
	11	15	-
	13	5	-
	21	40	-
	41	51	-
	42	30	-
	44	9	-
	52	2	-
	58	23	-
	95	31	-
	99	48	-
Total		369	925
5	41	22	-
	42	6	-
	74	1391	-
Total		1419	-
6	01	300	1700
	02	25	180
	03	15	200
	04	172	4000
	11	35	-
	13	30	-
	21	50	-
	22	15	-
	41	15	-
	42	210	-
	43	6	-
	50	25	-
	52	12	-
	58	30	-
	59	10	-
	71	50	-
	74	4	-
	75	5	-
	76	12	-

TABLE A-3 (Cont.)

ZONE	GLU[a]	ACRES	DU[b]
(Cont.)			
6	81	5	-
	82	15	-
	84	25	-
	95	5	-
	99	15	-
Total		1086	6080
7	01	150	1000
	02	5	60
	03	5	75
	04	133	4655
	08	10	140
	11	5	-
	13	20	-
	21	25	-
	41	46	-
	42	140	-
	43	2	-
	44	30	-
	52	9	-
	58	15	-
	71	30	-
	74	6	-
	76	2	-
	77	4	-
	82	15	-
	84	20	-
	86	10	-
	92	50	-
	95	5	-
	99	100	-
Total		837	5930
8	01	26	150
	02	43	424
	03	10	175
	04	90	3150
	41	23	-
	42	58	-
	43	2	-
	44	4	-
	52	7	-
	56	3	-
	58	3	-
(Cont.)			
8	71	10	-
	82	25	-
	86	11	-
	92	25	-
	95	3	-
	99	10	-
Total		353	3899
9	02	7	80
	21	190	-
	22	10	-
	23	1	-
	26	2	-
	41	58	-
	42	45	-
	43	10	-
	44	13	-
	56	2	-
	58	2	-
	83	13	-
	87	125	-
	91	94	-
	92	150	-
Total		722	80
10	01	40	150
	03	10	200
	04	41	1600
	11	4	-
	42	30	-
	43	5	-
	52	5	-
	57	3	-
	58	21	-
	59	5	-
	75	1	-
Total		165	1950
11	42	15	-
	43	7	-
	44	3	-
	50	76	-
	58	5	-
Total		106	-

TABLE A-3 (Cont.)

ZONE	GLU[a]	ACRES	DU[b]
12	01	4	20
	04	70	1750
	21	8	-
	42	30	-
	43	2	-
	44	4	-
	57	9	-
	58	14	-
	59	3	-
	71	5	-
	74	3	-
	76	1	-
	82	5	-
Total		158	1770
13	01	50	350
	02	15	210
	03	41	950
	04	113	4260
	11	5	-
	21	7	-
	42	70	-
	43	12	-
	58	18	-
	59	3	-
	71	15	-
	74	10	-
	75	1	-
	76	2	-
	77	8	-
	81	10	-
	82	10	-
	83	27	-
	95	2	-
Total		419	5770
14	03	7	140
	04	7	400
	13	1	-
	42	40	-
	43	6	-
	44	2	-
	52	3	-
	55	28	100
	58	5	-
	59	6	-

ZONE (Cont.)	GLU[a]	ACRES	DU[b]
14	71	9	-
	74	12	-
	76	2	-
	77	6	-
	84	9	-
Total		143	640
15	01	95	640
	02	12	150
	03	18	288
	04	35	910
	11	10	-
	13	15	-
	21	1	-
	22	4	-
	41	10	-
	42	65	-
	43	5	-
	44	2	-
	58	14	-
	59	2	-
	71	5	-
	75	1	-
	76	2	-
	77	2	-
	81	8	-
	82	10	-
Total		316	1988
16	01	2	10
	04	5	150
	11	30	-
	13	10	-
	21	10	-
	22	10	-
	24	8	-
	41	20	-
	42	42	-
	43	4	-
	58	2	-
	86	4	-
	99	10	-
Total		157	160

TABLE A-3 (Cont.)

ZONE	GLU[a]	ACRES	DU[b]
17	01	6	32
	02	28	350
	03	3	60
	04	162	3240
	08	25	290
	41	70	-
	42	30	-
	52	5	-
	57	14	-
	58	14	-
	71	25	-
	81	7	-
	82	25	-
	86	20	-
	87	25	-
	92	10	-
	95	2	-
Total		471	3972
18	01	311	1184
	02	2	20
	03	1	15
	04	25	550
	42	112	-
	44	1	-
	52	4	-
	56	7	-
	58	32	-
	59	2	-
	71	16	-
	76	2	-
	77	1	-
	81	4	-
	82	9	-
	84	17	-
Total		546	1769
19	01	390	1350
	02	8	90
	03	10	200
	04	40	1000
	42	160	-
	44	1	-
	56	4	-
	58	26	-
	59	3	-

ZONE (Cont.)	GLU[a]	ACRES	DU[b]
19	71	24	-
	76	12	-
	81	26	-
	82	19	-
	84	8	-
Total		731	2640
20	01	1	5
	02	5	50
	04	10	300
	08	19	220
	42	15	-
	52	13	-
	58	27	-
	99	3	-
Total		93	575
21	01	524	1863
	02	2	24
	04	8	125
	42	158	-
	43	6	-
	44	2	-
	52	13	-
	56	10	-
	58	3	-
	59	40	-
	71	34	-
	74	1	-
	75	22	-
	76	6	-
	82	12	-
	84	53	-
	92	10	-
	95	4	-
Total		908	2012
22	01	414	1656
	04	5	90
	41	20	-
	42	125	-
	44	4	-
	52	7	-
	71	30	-
	75	2	-
	76	2	-

TABLE A-3 (Cont.)

ZONE	GLU[a]	ACRES	DU[b]
(Cont.)			
22	81	5	-
	82	10	-
	83	11	-
	84	26	-
	86	13	-
	92	50	-
Total		724	1746

(a) Generalized Land Use
(b) Dwelling Units

Source: City of Mountain View Planning Department

TABLE A-4

TRAFFIC GENERATION FACTORS
1985 PROJECTIONS

TRAFFIC ZONES	FLOOR AREAS BY GENERAL LAND USE				OTHER GENERATION FACTORS
	Commercial (Sq. ft.)	Office (Sq. ft.)	Public and Quasi-Public (Sq. ft.)	Industrial (Sq. ft.)	
1	-	-	-	-	-
2	60,000	-	-	1,350,000	-
3	60,000	-	-	1,090,000	-
4	35,300	-	-	1,306,800	Motels (100 Units) Drive-In Theater (1400 Stalls)
5	Moffet Field, Naval Air Station and Ames Research Center				
6	700,000	160,000	-	1,887,600	-
7	217,800	-	-	1,089,000	-
8	96,000	-	-	-	Motel (60 Units)
9	22,300	-	-	3,537,000	-
10	213,600	54,400	-	87,000	Motels (250 Units)
11	760,000	82,000	-	-	-
12	275,500	28,000	-	145,000	Motel (25 Units)
13	220,000	225,000	-	8,700	-
14	267,000	165,000	200,000	-	Motel-Hotel (120 Units)
15	91,000	21,800	5,500	326,700	Motel (60 Units)
16	-	-	-	1,481,000	-
17	287,100	-	-	-	Motels (150 Units)
18	217,800	109,000	-	-	-
19	213,000	92,500	-	-	Motels (35 Units)
20	183,000	73,500	-	-	Motels (120 Units)
21	239,600	210,500 300,000 (Medical)	-	-	Hospital (460 Beds)
22	76,000	2,500	-	-	-

Source: City of Mountain View Planning Department

Table B-1

MAJOR STREET INVENTORY - 1985
Mountain View Traffic Circulation Study

TRAFFICWAY	LIMITS	CLASSIFICATION	AVERAGE DAILY TRAFFIC	MINIMUM CROSS-SECTION	NUMBER OF MOVING LANES	PRACTICAL CAPACITY	REMARKS
Bailey Ave.	El Camino Real - California	Arterial	25,000	A	6	30,000	
	California - Central Expressway	Arterial	35,000	B	6	35,000	
	Central Expressway - Stierlin	Arterial	20,000-23,000	C	4	25,000	
Calderon Ave.	El Camino Real - Dana	Arterial	20,000	D	4	25,000	
	Dana - Evelyn	Arterial	24,000	D	4	25,000	
	Evelyn - Central Expressway	Arterial	37,000	B	6		RR Grade Separation and Interchange with Central Expressway
	Central Expressway - Central	Arterial	5,000	E	2	12,000	
California St.	San Antonio - Rengstorff	Collector	15,000	D	4	20,000	
	Rengstorff - Bailey	Collector	15,000-16,000	D	4	20,000	
	Bailey - Castro	Local- Collector	14,000	D	4	25,000	
	Castro - Bush	Local- Collector	21,000	D	4	25,000	
Castro St.	Miramonte - El Camino Real	Arterial	12,000	D	4	25,000	
	El Camino Real - Evelyn	Local Business	11,000-12,000	C	4	15,000	
	Evelyn - Central Expressway	Arterial	17,000	D	4	25,000	
Central Expwy.	Charleston - Mountain View/Alviso	Expressway	35,000-49,000	County	6	50,000	County Expressway standards prevail
Charleston Rd.	Central Expressway - Middlefield	Arterial	17,000	D	4	25,000	
	Middlefield - San Antonio	Arterial	14,000	D	4	25,000	
	San Antonio - Bayshore Freeway	Arterial	17,000	D	4	25,000	
	Bayshore Freeway - Stierlin	Collector	3,000	E	2	7,500	
Cuesta Dr.	Springer - Miramonte	Arterial	15,000	D	4	25,000	
	Miramonte - Grant	Arterial	20,000	D	4	25,000	
Dana St.	Bush - Bernardo	Collector	13,000-20,000	D	4	20,000	
East Middle-field	Middlefield - Rengstorff	Arterial	25,000	D	4	25,000	
	Rengstorff - Bayshore Freeway	Arterial	25,000	D	4	25,000	
El Camino Real	City Limit - San Antonio	Arterial	58,000-60,000	A (State)	6	60,000	Recommended grade separation and interchange at San Antonio, see description in text on page 57.
	San Antonio - Bailey	Local Business	40,000-47,000	A (State)	6	50,000	
	Bailey - Grant/Alviso	Local Business	31,000-36,000	A (State)	6	50,000	
	Grant/Alviso - Bernardo	Local Business	26,000-38,000	A (State)	6	50,000	
Ellis St.	Middlefield - Fairchild	Arterial	14,000	D	4	25,000	
El Monte Ave.	Almond - Springer	Arterial	20,000	D	4	25,000	
	Springer - El Camino Real	Arterial	25,000	D	4	25,000	

Evelyn Ave.	Castro - Calderon	Arterial	10,000	E	2	12,000	
	Calderon - Whisman	Arterial	11,000-17,000	C	4	25,000	
	Whisman - Bernardo	Arterial	13,000	C	4	25,000	
Fairchild Dr.	Moffett - Ellis	Collector	5,000-14,000	Frontage Road	4	20,000	
Grant Rd.	Fremont - Cuesta	Arterial	10,000-18,000	C	4	25,000	
	Cuesta - Martens	Arterial	33,000	B	6	35,000	
	Martens - El Camino Real	Arterial	21,000	C	4	25,000	
L'Avenida	Stierlin - Moffett	Collector	10,000	E	2	12,000	
Middlefield Rd.	Charleston - San Antonio	Arterial	17,000	C	4	25,000	
	San Antonio - East Middlefield	Arterial	40,000	A	6	50,000	
	East Middlefield - Mountain View/ Alviso	Arterial	20,000-25,000	C	4	25,000	
Miramonte Ave.	Fremont - Cuesta	Arterial	13,000-20,000	D	4	25,000	
	Cuesta - Castro	Arterial	23,000-30,000	B	6	35,000	
	Castro - El Camino Real	Arterial	18,000	D	4	25,000	
Moffett Blvd.	Central Expressway - Bayshore Freeway	Arterial	14,000-21,000	D	4	25,000	
	Moffett Gate - Terminal	Arterial	5,000	E	2	12,000	
Mountain View-Alviso Rd.	El Camino Real - Bayshore Freeway	Freeway	30,000-45,000	State	4	50,000	
Phyllis Ave.	Grant - El Camino Real	Arterial	12,000	D	4	25,000	
Rengstorff Ave.	El Camino Real - Middlefield	Arterial	14,000-25,000	D	4	25,000	Grade Separation at railroad, inter-change with Central Expressway
	Middlefield - Bayshore Freeway	Arterial	7,000-10,000	E	2	12,000	
	Bayshore Freeway - Terminal	Arterial	4,000- 9,000	E	2	12,000	
San Antonio Rd.	Almond - El Camino Real	Arterial	25,000	C	4	25,000	Recommend grade separation and interchange at El Camino Real; see description in text on page 60.
	El Camino Real - Central Expwy.	Local Business	44,000-51,000	A	6	55,000	
	Central Expwy. - Middlefield	Arterial	39,000	A	6	50,000	
	Middlefield - Bayshore Freeway	Arterial	21,000	C	4	25,000	
	Bayshore Freeway - Terminal	Arterial	5,000	E	2	12,000	
Springer Rd.	Fremont - Cuesta	Arterial	8,000-11,000	D	4	25,000	
	Cuesta - El Monte	Arterial	13,000	D	4	25,000	
Stierlin Rd.	Central Ave. - Bailey	Arterial	11,000	D	4	25,000	
	Bailey - Bayshore Freeway	Arterial	18,000-25,000	C	4	25,000	
	Bayshore Freeway - Terminal	Arterial	5,000-18,000	C	4	25,000	
Terminal Ave.	San Antonio - Moffett	Arterial	2,000	C	4	25,000	Seasonal peaks to recreational areas will exceed the ADT shown; suggesting parkway treatment.
Whisman Rd.	Central Expressway - Fairchild	Collector	10,000-11,000	D	4	20,000	

* see Figure 19, page 39 for standard cross-sections.